8 Survey of NMR Parameters for Quadrupolar Nuclei in Powder Materials, in Particular for ^{27}Al, ^{23}Na and ^{17}O

Electric field gradient and chemical shift data for the three most commonly studied quadrupolar nuclei with half-integer spin, ^{27}Al, ^{23}Na, and ^{17}O, in inorganic powder materials are presented in Tables 8.1, 8.2 and 8.3, respectively.

The tables represent an incomplete collection of experimental data; calculated data are not included. Concerning the very usefull quantum chemical calculations, we refer to the review titled "Computing Electric Field Gradient Tensors" by Zwanziger [1]. He stated that "broadly speaking, outside the realm of systems dominated by dispersion forces, modern DFT (density functional theory) is accurate enough to provide a good description of the electronic structure and hence the EFG and quadrupole coupling in a very wide range of solids" [1].

For solid-state NMR studies of other quadrupolar nuclei in solid materials, we refer to the Web of Science Core Collection. A search in this data base returns for all quadrupolar nuclei the following numbers of publications from 1950 to the end of 2024:

deuterium-2	1620	calcium-43	964	rubidium-85	7	cesium-133	193
lithium-6	373	scandium-45	113	rubidium-87	98	barium-135	4
lithium-7	1172	titanium-47/49	48	strontium-87	17	barium-137	13
beryllium-9	41	vanadium-50	0	zirconium-91	32	lanthanum-138	1
boron-10	5	vanadium-51	520	niobium-93	93	lanthanum-139	60
boron-11	372	chromium-53	6	molybdenum-95	76	hafnium-177	0
nitrogen-14	532	manganese-55	30	molybdenum-97	0	hafnium-179	0
oxygen-17	1141	cobalt-59	100	technetium-99	20	tantalum-181	2
neon-21	0	nickel-61	4	ruthenium-99	8	rhenium-185/187	10
sodium-23	1169	copper-63/65	121	ruthenium-101	0	osmium-189	0
magnesium-25	139	zinc-67	61	palladium-105	5	iridium-191	0
aluminum-27	5426	gallium-69/71	284	indium-113	9	iridium-193	0
sulphur-33	49	germanium-73	23	indium-115	48	gold-197	13
clorine-35/37	191	arsenic-75	26	antimony-121	22	mercury-201	4
potassium-39	76	bromine-79	47	antimony-123	5	bismuth-209	14
potassium-40	0	bromine-81	24	iodine-127	46		
potassium-41	0	krypton-83	2	xenon-131	6		

The search string *PY=1950-2024 AND (TS="NMR" OR TS="nuclear magnetic resonance") AND (TS="solid-state" OR TS="*MAS" OR TS="DOR")* was used for solid-state NMR, the extension *AND (TS= "H-2 NMR" OR TS= "2H NMR" OR TS= "deuterium NMR" OR TS= "solid-state H-2" OR TS= "H-2 MAS" OR TS= "deuterium-2")* was applied for ^{2}H NMR, and an extensions like *AND (TS= "aluminum-27" OR TS= "Al-27" OR TS= "27Al NMR")* were used for all other nuclei except boron-10 and boron-11, for which *"B-11 NMR"* was used instead of *"B-11"*. Combinations like *"Ti-47,49"* were added in some cases.

A very useful source of literature concerning special nuclei is the comprehensive and regularly updated compilation of quadrupole effects and their applications in solid-state NMR, offered by P. Man on his Internet page www.pascal-man.com. M. E. Smith [2] presented in 2020 a review involving 19 half-integer spin low-γ quadrupolar nuclei in inorganic materials.

Table 8.1. ^{27}Al, quadrupole coupling constant $C_\mathrm{Q} = e^2qQ/h$, the asymmetry parameter η, and the isotropic value of the chemical shift δ (referred to 1.0 M $AlCl_3$ $6H_2O$ [3]) for the ^{27}Al NMR of powder compounds at ambient temperature. The data published from 1983-1992 were compiled by Müller [4]. Chandran *et al.* [5] presented in 2019 a review on ^{27}Al NMR studies of all known transition alumina phases and proposed a new 3D correlative method of NMR parameters, enabling fingerprinting and identification of such phases. It includes the aluminas χ, κ, θ, γ, δ, η, ϱ and α-alumina as their final outcome of a calcination above 1350 °C [5]. In 2020, a review on ^{27}Al NMR studies of aluminosilicate glasses was given by Edén [6].

The acronym "qp" appears in the column for η, if the column C_Q contains the quadrupolar product parameter $P_\mathrm{Q} = C_\mathrm{Q}\sqrt{1+\frac{\eta^2}{3}}$ instead of C_Q.

Compound	site	C_Q/ MHz	η	δ /ppm	Refs.
Aluminum compounds without B, C, N, F, Si, P, S					
α-$Al(OH)_3$ (bayerite)	AlO_6	2.9	qp	11	[7]
	AlO_6-(1)	1.4	0.80	13.1	[5, 8]
	AlO_6-(2)	1.9	0.25	9.1	[5, 8]
γ-$Al(OH)_3$ (gibbsite)	AlO_6-(1)	2.2	qp	11	[9]
	AlO_6-Al(2)	2.2	0.75	10.5	[8]
	AlO_6-(2)	4.5	0.45	12	[9]
	AlO_6-Al(1)	4.7	1.00	17.2	[8]
	AlO_6-I	4.6	0.4	13.6	[5, 10]
	AlO_6-II	2.2	0.7	11.3	[5, 10]
α-AlO(OH) (diaspore)	AlO_6	3.4	0.8	17.0	[5, 11]
γ-AlO(OH) (boehmite)	AlO_6	-		9 (anisotr.)	[12]
	AlO_6	1.8-2.8	0.5-1.0	12.6	[5, 8]
α-Al_2O_3 (corundum)	AlO_6	2.40	0.01	18.8	[13]
α-Al_2O_3	AlO_6	1.58	qp	10.7	[14]
	AlO_6	2.38	0.0	13.5	[5, 15]
grain size 12-52 nm	AlO_6	2.4	0.05	16.0	[5, 16]
grain size 3.8 nm / 13 nm	AlO_4	2.4	-	71	[17]
	AlO_6	2.4	-	14	[17]
γ-Al_2O_3 (non-hydrated)	AlO_4	8.5	0.8	68	[18]
	AlO_6	5.5	0.7	13	[18]
γ/δ/θ-Al_2O_3 (calcined)	$AlO_6^{(1)}$	4.9/4.8/4.4	0.0/0.0/0.0	16.9/16.3/15.8	[19]
	$AlO_6^{(2)}$	5.5/4.3/2.9	0.4/0.6/0.3	15.7/14.5/13.2	[19]
	$AlO_6^{(3)}$	4.4/3.5/3.5	0.5/0.5/0.5	11.0/10.8/10.2	[19]
	$AlO_6^{(4)}$	6.0/5.9/5.9	0.6/0.6/0.6	8.6/9.8/9.7	[19]
	$AlO_4^{(1)}$	6.4/6.0/6.2	0.5/0.7/0.7	78.8/80.0/80.3	[19]
	$AlO_4^{(2)}$	6.1/4.6/4.9	0.5/0.6/0.6	73.9/73.2/73.0	[19]
	$AlO_4^{(3)}$	6.6/6.6/6.6	0.6/0.4/0.4	67.5/68.3/66.7	[19]
γ-Al_2O_3 (hydrated)	AlO_4	5.1	-	71.5	[20]
	AlO_5	5.1	-	44.0	[20]
	AlO_6	3.55	-	10.0	[20]
grain size 3.8 nm / 13 nm	AlO_4	0.06	-	63	[17]
	AlO_5	0.06	-	43	[17]
	AlO_6	0.06	-	7	[17]
γ-Al_2O_3 (dehydrated, needles)	AlO_4	15.5	0.1	82	[21]
	AlO_4	13.2	0.5	72	[21]
	AlO_6	11.8	0.5	18	[21]
η- Al_2O_3 size 3.8 nm / 13 nm	AlO_6	0.08	-	−6	[17]
ρ-Al_2O_3	AlO_4, AlO_5, AlO_6	insufficiently resolved			[22]

κ-Al_2O_3	AlO_4	7.6	0.3	81.5	[23]
	AlO_6-(1)	5.0	-	ca. 13	[23]
	AlO_6-(4)	8.5	-	18	[23]
χ-Al_2O_3 (part. dehydr. gibbsite)	AlO_4	5.0	0.3	71.5	[24]
	AlO_5	2.7	0.3	38.5	[24]
	AlO_6	4.5	0.3	11.5	[24]
θ-Al_2O_3	AlO_4	6.4	0.65	80	[15]
	AlO_6	3.5	0	10.5	[15]
η-, γ-, δ-, θ-Al_2O_3	AlO_4	4.7-5.5	0.4-0.8	74-80	[25]
	AlO_6	3.0-4.0	0.4	11-15	[25]
$CaO{\cdot}6Al_2O_3$	AlO_4	2.0	$0_{assumed}$	65	[26]
	AlO_5	6.7	$0_{assumed}$	27.5	[27]
	AlO_6-(1)	1.5	$0_{assumed}$	9	[26]
	AlO_6-(2)	<1	$0_{assumed}$	16	[26]
$CaO{\cdot}2Al_2O_3$	AlO_4-(1)	6.7	0.8	78	[26]
	AlO_4-(2)	13	0.1	ca. 60	[26]
$CaO{\cdot}Al_2O_3$	AlO_4-(1)	2.7	0.85	80	[26]
	AlO_4-(2)	2.7	0.85	83	[26]
$4CaO{\cdot}3Al_2O_3$	AlO_4	2.4	0.95	80	[26]
$12CaO{\cdot}7Al_2O_3$	AlO_4-(1)	3.7	0.9	79	[26]
	AlO_4-(2)	11	0.2	85	[28]
$3CaO{\cdot}Al_2O_3$	AlO_4	9.7	0.3	85	[28]
	AlO_4-(1)	8.69	0.32	79.5	[29]
	AlO_4-(2)	9.3	0.54	78.25	[29]
$4CaO{\cdot}3Al_2O_3{\cdot}3H_2O$	AlO_4-(1)	1.8	0.5	78	[26]
	AlO_4-(2)	5.4	0.45	79	[26]
$CaAl_4O_7$	AlO_4-(1)	6.25	0.88	75.5	[30]
		6.4	0.90	68.1	[31]
	AlO_4-(2)	9.55	0.82	69.5	[30]
		9.5	0.82	59.1	[31]
$CaAl_{12}O_{19}$	site 1/2	3.2/4.2	0.0/0.0	65.7/20.0	[31]
	site 3/4/5	4.5/-/-	0.9/-/-	18.0/13.6/6.7	[31]
	site 1/2	0.15/21.4	-/0.00	16.25/55.8	[32]
	site 3/4/5	3.1/1.6/4.8	0.00/-/0.7	68.1/9.92/22.3	[32]
$SrAl_{12}O_{19}$	site 1/2	0.25/20.75	-/0.00	16.72/57.8	[32]
	site 3/4/5	3.45/1.35/4.9	0.00/-/0.65	67.5/9.45/22.1	[32]
	AlO_4/AlO_4-d	3.455/20.71	0.5/0.00	67.90/56.91	[33]
	AlO_5	2.590	qp	19.50	[33]
	AlO_6-1/2	17.50/10.06	qp/qp	17.50/10.06	[33]
	AlO_6-3	4.990	0.65	21.73	[33]
$LaSrAl_3O_7$	site 1	3.0	0.5	75.4	[34]
	site 2	6.8	0.5	83.3	[34]
$LaSrAl_{1.5}Ga_{1.5}O_7$	site 1	4.2	0.5	78.7	[34]
	site 2	7.0	0.5	83.8	[34]
$CaAl_2O_4$	AlO_4-(1-5)	2.4-4.2	0.2-0.95	81.2-86.2	[30]
$Ca_{12}Al_{14}O_{33}$	AlO_4-(1)/(2)	9.7/3.8	0.4/0.7	85.9/80.2	[30]
$Ca_3Al_2O_6$	AlO_4-(1)/(2)	8.69/9.3	0.32/0.54	79.5/78.3	[30]
$CaAl_2H_{20}O_{14}$	AlO_6	2.4	qp	10.2	[30]
$Ca_3Al_2H_{12}O_{12}$	AlO_6	0.705	0.09	12.36	[30]
$Ca_4Al_2H_{26}O_{20}$	AlO_6	1.8	qp	10.2	[30]
$KAlO_2$	AlO_4	1.1	0.7	76	[28]
$KAlO_2{\cdot}0.5H_2O$	AlO_4	5.6	0.0	77	[28]
$KAlO_2{\cdot}H_2O$	AlO_4	6.5	0.6	83	[28]

$KAlO_2 \cdot 1.5H_2O$	AlO_4	5.0	0.25	81	[28]
$5BaO \cdot Al_2O_3$	AlO_4	2.3	0.8	80	[28]
$BaO \cdot Al_2O_3$	AlO_4	2.4	0.4	78	[28]
α-$BaO \cdot Al_2O_3 \cdot 2H_2O$	AlO_4-(1)/(2)	3.4/5.1	0.5/0.9	81/80	[28]
α-$LiAlO_2$	AlO_6	2.8	0.05	16	[35]
β-$LiAlO_2$	AlO_4	1.8	0.55	82	[35]
	AlO_4	1.86	0.56	83.0	[36]
γ-$LiAlO_2$	AlO4	3.2	0.7	81	[35]
single crystal	AlO_4	3.330	0.656	81.8	[37]
β-$NaAlO_2$	AlO_4	1.4	0.5	80	[28]
$NaAl_9O_{14}$	AlO_4	3.4	qp	55.9	[38]
	AlO_6	2.8	qp	9	[38]
$AlCl_3 \cdot 3Al(OH)_3 \cdot 6H_2O$	AlO_6	6.9	0.4	7	[4]
$AlCl_3 \cdot 4Al(OH)_3 \cdot 7H_2O$	AlO_6	5.7	0.7	3	[4]
$AlCl_3 \cdot OPCl_3$	$AlCl_3O$	6.0	0.15	88	[39]
$Al_2Ge_2O_7$	AlO_5	8.8	0.4	36	[40]
$AlLaGe_2O_7$	AlO_5	7.2	0.37	36	[40]
$Al_2(MoO_4)_3$	AlO_6-(1)/(2)	1.12/0.88	0.65/0.95	−12.4/−13.4	[41]
	AlO_6-(3)/(4)	1.21/0.78	1.0/0.8	−10.3/−11.1	[41]
$MgAl_2O_4$ (spinel)	AlO_4	3.2	0.50	76.5	[42]
	AlO_6-1	3.73	0.26	14.5	[42]
	AlO_6-2	4.46	0.4	−1.0	[42]
$Cd_8(AlO_2)_{12}S_2$ (sodalite)	AlO_4	2.00	< 0.1	80.4	[43]
$Ca_8(AlO_2)_{12}S_2$ (sodalite)	AlO_4	3.55	< 0.1	79.1	[43]
$Cd_8(AlO_2)_{12}Se_2$ (sodalite)	AlO_4	3.95	< 0.1	78.7	[43]
$Cd_8(AlO_2)_{12}(SO_4)_2$ (sodalite)	AlO_4	3.24	< 0.1	79.1	[43]
$Sr_8(AlO_2)_{12}S_2$ (sodalite)	AlO_4	4.65	< 0.1	76.9	[43]
$Sr_8(AlO_2)_{12}Se_2$ (sodalite)	AlO_4	5.10	< 0.1	76.6	[43]
$Sr_8(AlO_2)_{12}(CrO_4)_2$ (sodalite)	AlO_4	6.75	< 0.1	75.5	[43]
$SrAl_{12}O_{19}$	AlO_4	3.45	0.1	68.0	[44]
	AlO_5	2.1	0.7	18.0	[44]
	AlO_6-(1)	0.6	1	17.1	[44]
	AlO_6-(2)	1.3	1	9.6	[44]
	AlO_6-(3)	4.9	0.63	21.7	[44]
$Sr_4Al_{14}O_{25}$	Al1/Al2/Al3	4.4/5.2/4.2	0.8/0.8/0.2	78/82/77	[45]
	Al4/Al5/Al5	2.4/6.8/9.2	0.1/0.2/0.0	12/12/11	[45]
$YAlO_3$	AlO_6	1.61	qp	10.7	[14]
$Y_4Al_2O_9$	AlO_4-1	10.81	0.48	78.2	[14]
	AlO_4-2	10.36	0.77	76.2	[14]
$Y_3Al_5O_{12}$	AlO_6	1.13	qp	2.1	[14]
	AlO_4	6.21	0.05	77.5	[14]
	AlO_6	1.13	qp	2.1	[14]
$Y_3Al_5O_{12}$ (YAG II 800)	AlO_6/AlO_5	-	-	1.2/23.6	[46]
	AlO_4	6.0	0.08	76.6	[46]
$Y_3Al_5O_{12}$ (YAG)	AlO_6	0.6	-	5.38	[47]
	AlO_4	6.1	-	82	[47]
$AlVO_4$	Al1	1.64	0.30	−8.9	[48]
	Al2	6.73	0.42	27.2	[48]
	Al3	5.88	0.58	−1.1	[48]
ZrO_2-Al_2O_3 (co-hydrolysis,	AlO_4/ AlO_5	10.0/5.0	-	78/37	[49]
annealed at 1000 °C)	AlO_6	7.0	-	16	[49]

$MgO\text{-}Al_2O_3$ (annealed 600 °C)	AlO_4/ AlO_5	10.5/10.0	-	82/41	[49]
	AlO_6	7.0/2.0	-	17/15	[49]
$CsAlH_4$ orthorhombic	MAS/static	1.42/1.42	0.60/0.62	121.4/122	[50]
$CsAlH_4$ tetragonal	MAS/static	1.42/1.43	<0.05/<0.03	116.8/116	[50]
$KAlH_4$	MAS/static	1.29/1.30	0.64/0.64	107.6/108	[51, 52]
$NaAlH_4$	MAS/static	3.11/3.11	<0.05/0.01	97.2/99	[51, 52]
$NaAlH_4$		3.15	0.04	97.5	[53]
Na_3AlH_6 doped/non-doped		0.52/0.70	0.5/0.2	−42.7/−42.5	[53]
Na_2LiAlH_6		<0.1	-	−46	[53]
ZrNiAl	Al-Ni	3.3	0.42	393	[54]
Zeolites and zeolite-like materials					
Zeolite Na-A (hydrated)	AlO_4	1.1	0.75	59.2	[55]
Zeolite H, Na-A (dehydrated)	AlO_3	12	-	-	[56]
Zeolite Na-Y (hydrated)	AlO_4	2.0	0.5	62.8	[55]
Zeolite Na-Y (dehydrated)	AlO_4	5.5	0.3	ca. 60	[57]
Zeolite H-Y (dehydrated)	AlO_3	13.1	0.75	105±20	[57]
	AlO_3	15.3	0.4	60	[58]
Zeolite Al, Na-Y (dehydrated)	AlO_4/Al^{x+}	14.5	0.3	70	[18]
	AlO_4/Na^+	5.5	0.8	60	[18]
	Al^{x+}cat.	6.0	0.7	35	[18]
Zeolite H, Na-Y (hydrated)	AlO_4/H^+	16.0/14.0	0.3	70	[18]
	AlO_4/Na^+	5.5	0.8	60	[18]
Dealumin. H, Na-Y (hydr.)	AlO_4/H^+	15.0	0.3	70	[18]
	AlO_4/Na^+	8.0	0.8	65	[18]
	Al^{x+}cat.	7.5	0.7	35	[18]
	AlO_6 cluster	5.0	0.7	10	[18]
Zeolite USY (hydrated)	$AlO_4/AlO_5/AlO_6$	2.8/4.1/2.9	-	60.0/34.5/4.0	[20]
	AlO_4 (4 sampl.)	1.9-7.5	qp	60.5-69.7	[59]
	AlO_5 (4 sampl.)	3.9-4.6	qp	34.0-39.8	[59]
	AlO_6 (4 sampl.)	1.9-3.2	qp	0.1-7.5	[59]
Zeolite Y, dealuminated	AlO_5-1/2	5.0/5.6	-	29/35	[60]
	AlO_4-1/2/3	15.0/4.2/11.2	-	57/58/60	[60]
Zeolite Ti-USY	AlO_4	2.0/1.5	qp/qp	64.4/61.1	[61]
	AlO_5	3.2	qp	33.9	[61]
	AlO_6	2.0/1.6	qp/qp	6.0/0.01	[61]
Zeolite H-MOR (dehydrated)	AlO_3	15.0	0.35	-	[62]
	AlO_4	6.8	0.7	-	[62]
Zeolite MOR (dehydrated)	AlO_4	14	-	58	[21]
	AlO_4	19	-	57	[21]
Zeolite NH_3(H)-MOR	$AlO_4(NH_4)/(H)$	1.9/5.6	qp/ qp	45/35	[63]
Zeolite BEA (Si/Al=9-215)	Td1	2.3-2.5	qp	57.5-59.0	[64]
	Td2	1.7-1.9	qp	53.5-54.0	[64]
Zeolite H-BEA (Si/Al=9-215)	Td1	1.0-2.0	qp	58.5-60.0	[64]
	Td2	1.1-1.7	qp	55.0-60.0	[64]
Zeolite H-BEA (dehydrated)	AlO_3	16	0.1	-	[56]
Zeolite BEA (3 samples)	AlO_4 (2b)	2.3-2.4	qp	58.0-58.4	[65]
	AlO_4 (2a)	1.5-1.8	qp	53.9-54.2	[65]
	AlO_6	-	-	≈0	[65]
Zeolite H-BEA	Al'+CD3CN	14	0.7	70	[66]
	Al'+H2O	13	0.9	70	[66]
	SiOHAl	3.5	0.85	60	[66]
	Penta-co. Al	3.5	0.5	40	[66]

Zeolite Na-ZSM-5 (dehydrated)	AlO_4	4.7	0.5	≈60	[57]
Zeolite H-ZSM-5 (dehydrated)	AlO_3	16.0	0.1	82±20	[57]
	AlO_3	15.5	0.5	-	[62]
	AlO_4	7.3	0.7	-	[62]
Zeolite H-ZSM-5 (dehydrated)	AlO_4-1	17.5	0.1	-	[67]
	AlO_4-2	11.0	0.6	-	[67]
Zeolite H-ZSM-5 (dehydrated)	AlO_4	16.1/11.1	0.16/0.66	53.7/57.7	[68]
Zeolite ZSM-5 Si/Al=14-250,	AlO_4, Peak I	1.6-1.7	qp	54.4-55.7	[69]
7 samples	AlO_4, Peak II	1.5-1.6	qp	52.2-52.3	[69]
Zeolite TPA-ZSM-5	AlO_4 (1)/(2)	1.4/1.8	qp/ qp	52.2/54.9	[70]
Zeolite H-ZSM-5	AlO_4(1)/(2)	1.2/1.6	qp/ qp	55.5/56.5	[70]
Zeolite NH_3(H)-ZSM-5	AlO_4(1)/(2)	1.2/1.6	qp/ qp	53.8/56.4	[70]
Zeolite ZSM-23	AlO_4(1)−(5)	1.6−2.6	qp	54.4−58.0	[71]
Zeolite TNU-9	AlO_4	2.1-2.3	qp	53.5-57.2	[72]
Zeolite Li-CHA (hydrated)	AlO_4	2.4	qp	60.0	[73]
Zeolite Li-CHA (dehydrated)-I	AlO_4	5.3	qp	62	[73]
Zeolite Li-CHA (dehydrated)-II	AlO_4	7.3	qp	57	[73]
Zeolite Na-CHA (hydrated)	AlO_4	1.8	qp	59.5	[73]
Zeolite Na-CHA (dehydrated)	AlO_4	4.2	qp	61	[73]
Zeolite K-CHA (hydrated)	AlO_4	1.8	qp	59.5	[73]
Zeolite K-CHA (dehydrated)	AlO_4	2.9	qp	60	[73]
Zeolite ITQ-33	T4	1.11/1.12	qp	52.38/53.46	[74]
	T3	2.20/2.21/2.19	qp	60.75/62.07/63.22	[74]
$AlPO_4$-5 (hydrated)	AlO_4	2.3	0.95	40.4	[75]
$AlPO_4$-8 (dehydrated)	AlO_4-(1)/(2)	3.9/3.6	$0.5_{ass.}$/ $0.5_{ass.}$	40.1/40.6	[76]
	AlO_4-(3)/(4)	3.6/3.0	$0.5_{ass.}$/ $0.5_{ass.}$	47.0/42.9	[76]
	AlO_4-(5)	3.4	$0.5_{assumed}$	42.6	[76]
$AlPO_4$-14 (hydrated)	AlO_5-(Al1[77])	5.66	0.89	27.2	[78]
	AlO_5-(3)(Al1[77])	5.58	0.97	27.1	[79]
	AlO_5-Al1	5.6	1.0	27	[80]
	AlO_4-(Al2 [77])	4.15	0.82	44.0	[78]
	AlO_4-(2)(Al2 [77])	4.08	0.82	43.5	[79]
	AlO_4-Al2	4.1	0.8	44	[80]
	AlO_4-(Al3 [77])	1.75	0.70	43.2	[78]
	AlO_4-(1)(Al3 [77])	1.74	0.63	42.9	[79]
	AlO_4-Al3	1.7	0.6	43	[80]
	AlO_6-(Al4 [77])	2.60	0.68	−0.9	[78]
	AlO_6-(5)(Al4 [77])	2.57	0.7	−1.3	[79]
	AlO_4-Al4	2.6	0.7	−1	[80]
$AlPO_4$-14 (dehydrated)	AlO_4-Al1	4.0	0.8	43	[80]
	AlO_4-Al2	3.4	0.2	43	[80]
	AlO_4-Al3	2.5	0.6	38	[80]
	AlO_4-Al4	4.9	0.3	45	[80]
$AlPO_4$-14A (dehydrated)	AlO_4-Al1	4.5	-	63.4	[81]
	AlO_4-Al2	4.1	-	43.1	[81]
	AlO_4-Al3	4.7	-	45.5	[81]
	AlO_4-Al4	2.6	-	−14.9	[81]
$AlPO_4$-15	Al1	3.1	0.8	2.5	[82]
	Al2	3.1	0.8	−5.0	[82]
AlPO-CJ19 $(NH_4)_2Al_4(PO_4)_4(HPO_4)\cdot H_2O$	Al(1)	3.8	-	47.6	[83]
	Al(2)	4.2	0.1	17.0	[83]
	Al(3)	1.4	-	−13.4	[83]
	Al(4)	2.6	-	48.1	[83]

$AlPO_4$-21 (hydrated)	AlO_4	8.3	0.15	47.3	[84]
	AlO_5-(1)/(2)	5.9/7.4	0.68/0.52	14.6/15.7	[84]
$AlPO_4$-25 (hydrated)	AlO_4-(1)/(2)	1.9/0.8	$0.67_{ass.}$/$0.67_{ass.}$	40.8/39.5	[84]
$AlPO_4$-25 (dehydrated)	AlO_4-(1)	2.3/1.1	$0.67_{ass.}$/$0.67_{ass.}$	39.2/37.5	[84]
$AlPO_4$-34 (six samples)	$Al1_{octa}$	1.3-2.2	qp	−5.1-−4.0	[85]
	$Al2_{tetra}$	2.0-2.9	qp	42.7-46.7	[85]
	$Al3_{zetra}$	2.5-4.4	qp	46.0-48.0	[85]
$AlPO_4$-53 (hydr. and dehydr.)	sites Al1-Al6	2.0-9.2	0-0.9	17-45	[86]
$AlPO_4$-ZON	site Al1	3.8	qp	50.6	[87]
	site Al2	3.6	qp	43.0	[87]
	site Al3	4.9	qp	27.2	[87]
	site Al4	6.3	qp	24	[87]
$AlPO_4$-SOD as-synthesized	Al1/2/3	2.3/2.4/2.7	0.79/0.79/0.82	38/41/−8.5	[88]
dehydrated at 200 °C	Al1/2/3	2.6/2.8/2.6	0.99/0.42/0.92	39/37/36	[88]
	Al4/5	2.7/2.4	0.35/0.98	12/−12	[88]
$AlPO_4$-STA-1	Al1/2	3.67/4.13	0.39/0.59	45.3/42.2	[89]
	Al3/4	3.84/4.81	0.93/0.90	49.2/43.3	[89]
$AlPO_4$-STA-2	Al1/Al2	2.0/3.5	0.7/0.9	36.0/42.0	[90]
	AlO_4 3 sites	2.4/3.6/2.1	qp/qp/qp	39/45/49	[91]
	AlO_5	3.1	qp	17	[91]
K,Na-JBW (Na_2Rb-$[AlGeO_4]_3{\cdot}H_2O$)	AlO_4	1.8	0.69	61.7	[92]
$Na_8Cl_2[Al_6Si_6O_{24}]$ (NaCl-sodalite)		0.7	qp	64.7	[93]
$Na_8Cl_2[Al_6Si_6O_{24}]$ (blue sodalite)	AlO_4	1.45	0.1	40	[94]
$Na_{8.0}Cl_{1.8}[AlSiO_4]_6 \cdot 0.4\ H_20$	AlO_4	0.94	0.32	62.9	[95]
$Na_8Br_2[Al_6Si_6O_{24}]$ (NaBr-sodalite)		0.8	qp	63.2	[93]
$Na_8I_2[Al_6Si_6O_{24}]$ (NaI-sodalite)		0.6	qp	61.2	[93]
$Na_8[Al_6Si_6O_{24}]{\cdot}(H_3O_2)_2$ (basic sodalite)		0.8	qp	64.5	[96]
$Na_8Br_2\ [Al_6Si_6O_{24}]\cdot$ (basic sodalite)		0.8	qp	63.4	[96]
$Na_{7.7}Br_{1.8}[AlSiO_4]_6 \cdot 0.4\ H_20$	AlO_4	0.81	0.29	61.8	[95]
$Na_6[Al_6Si_6O_{24}]{\cdot}(4H_2O)_2$ (hydro sodalite)		2.2	qp	65.6	[96]
$Na_8Br_2\ [Al_6Si_6O_{24}]$ (dry sodalite)		0.8	qp	63.4	[96]
$Li_{7.6}Na_{0.4}Cl_{1.9}[AlSiO_4]_6 \cdot 0.7\ H_20$	AlO_4	0.98	0.59	71.9	[95]
$Li_{7.3}Na_{0.3}Br_{1.8}[AlSiO_4]_6 \cdot 1.1\ H_20$	AlO_4	0.71	0.61	70.9	[95]
$Na_{7.8}I_{1.7}[AlSiO_4]_6 \cdot 0.6\ H_20$	AlO_4	0.57	0.34	60.4	[95]
$Ca_8(OH)_8Al_8Si_4O_{24}$ (sodalite)	AlO_4	5.3	0.24	-	[97]
$Na_6\ [AlSiO_4]_6$ (sodalite)		2.7	$0_{assumed}$	54	[98]
$Na_6Zn_2[AlSiO_4]_6(SO_4)_2$ (sodalite)		2.5	$0_{assumed}$	58	[98]
Other (non-zeolite) aluminosilicates					
H, Al-MCM-41 (as synthesized)	AlO_4	2.3	$0_{assumed}$	52.6	[99]
Al_2O_3-B_2O_3-SiO_2-Na_2O glasses		3.7-4.2	qp	59-63	[100]
$0.5Al_2O_3{-}xSiO_2$ glasses	AlO_4	5.3-6.5	qp	59-68	[88]
with $1 \leq x \leq 6$	AlO_5	4.6-5.3	qp	32-37	[88]
	AlO_6	3.9-4.6	qp	3-6	[88]
Na_2O-CaO-Al_2O_3-SiO_2 glass ANCS	AlO_4	6.8	-	60.5	[101]
	AlO_5	7.4	-	34.7	[101]
$Al_2Si_2O_5(OH)_4$ (kaolinite)	AlO_6	3.6	qp	7	[9]
	AlO_6 (1)/(2)	3.4/3.0	0.8/0.9	7.5/8.0	[102]
Al_2SiO_5 (sillimanite)	AlO_4	6.77	0.53	64.5	[55]
	AlO_4	6.74	0.51	63.9	[103]
	AlO_6	8.93	0.46	4.0	[55]
	AlO_6	8.83	0.49	4.7	[103]
Al_2SiO_5 (andalusite)	AlO_5/AlO_6	5.6/15.3	0.76/0.13	35.2/11.9	[104]

Al_2SiO_5 (kyanite)	AlO_6-(1)/(2)	10.1/3.8	0.27/0.85	13.0/4.0	[104]
	AlO_6-(3)/(4)	6.4/9.2	0.70/0.38	5.7/5.9	[104]
$Al_4Si_8O_{20}(OH)_4$ (pyrophillite)	AlO_6			4.3	[105]
dehydroxylate (550 °C)	AlO_5	10.5	0.6	29	[105]
$K_{1.5}Al_4(Si_{6.5}Al_{1.5})O_{20}(OH)_4$ (illite)	AlO_4	2.9	-	72.4	[106]
	AlO_6	3.7	-	6.0	[106]
$3Al_2O_3{\cdot}SiO_2$ (mullite)	AlO_6	7.3	0	6.3	[107]
	AlO_4 (T)/(T')	7.3/6	0/0.5	68/53	[107]
	AlO_4 (T*)	4	0.5	45	[107]
$2Al_2O_3{\cdot}SiO_2$ (2:1 mullite)	AlO_6 site 1	4.5	qp	7.5	[108]
	site 2	3.2	qp	49	[108]
	AlO_4 site 3	4.6	qp	69.4	[108]
$3Al_2O_3{\cdot}2SiO_2$ (mullite precursor	site 1a/1b	4.3/3.4	qp/qp	7/15	[109]
obtained by sol-gel synthesis)	site 2	4.3	qp	37	[109]
	site 3	4.1	qp	71	[109]
$Mg_3Al_2Si_3O_{12}$ (pyrope)		1.0	0.5	2.9	[110]
$Ca_3Al_2Si_3O_{12}$ (grossular)		3.7	0.2	−3.35	[110]
$Ca_2Al_3Si_3O_{12}$-(OH) (zoisite)	AlO_6 1/2	7.9/18.4	0.51/0.16	10.7/8.0	[111]
	AlO_6 1/2	8.0/18.19	0.53/0.13	10.7/7	[112]
$CaAlAlSiO_6$ (clinopyroxene)	AlO_6 a/b/c	5.0/4.6/5.6	0.5/0.7/0.7	2.7/8.6/13.5	[113]
	AlO_4 d/e	5.4/11.8	0.5/0.45	66.5/79.7	[113]
$Sr_3Al_{10}SiO_{20}$	Al(1)/ Al(2)	3.73/8.13	0/0.3	7.2/12.0	[114]
	T_2(4Al)	2.61	0	82.0	[114]
	T_1+T_2(*n*Al, *m*Si)	6.86	0.3	78.0	[114]
$(Mg,Fe,Al)_6(Si,Al)_4O_{11}(OH)_8$	AlO_4	2.8	-	72	[55]
(pennine, penninite)	AlO_6	1.4	-	10	[55]
$KAlSi_2O_6$ (leucite)	T1/T2/T3	2.07/2.58/2.34	qp	61.0/63.9/69.2	[115]
$CaAl_2Si_2O_8$ (anorthite)	6 sites	2.7−8.2	0.45-0.70	61-66	[115]
$Na_{16}Ca_{16}(AlO_2)_{48}(SiO_2)_{72}$ (mesolite)	Al(1)	3.0	0	64.4	[116]
	Al(2)/ Al(3)	1.9/2.0	0/0	62.6/65.1	[116]
$KAl_2[(OH,F)_2/AlSi_3O_{10}]$	AlO_4	2.1	-	72	[55]
(muscovite)	AlO_6	2.2	-	5	[55]
$CaAl_2[(OH)_2/Al_2Si_2O_{10}]$	AlO_4	4.2	-	76	[55]
(margarite)	AlO_6	6.3	-	11	[55]
$CaMg_3Al_2Si_2O_{10}(OH)_2$	AlO_4	2.8	-	76	[55]
(xantophyllite)	AlO_6	2.0	-	11	[55]
$Na_8Al_2Be_2Si_8O_{24}Cl_2$ (tugtupite)	AlO_4	1.36	0.08	63.4	[117]
$NaAlSi_3O_8$ (low albite)	AlO_4	3.29	0.62	62.7	[118]
$Na_2Al_2Si_3O_{10}{\cdot}2H_2O$ (natrolite)	AlO_4	1.67	0.50	64	[55]
$Na_2Al_2Si_3O_{10}{\cdot}2H_2O$ (tetranatrolite)	AlO_4 T1/T2	2.2/2.4	qp/qp	63.1/64.2	[119]
$KAlSi_3O_8$ (microcline)	AlO_4	3.22	0.21	58.5	[118]
Na,K $AlSi_3O_8$ (feldspar)	8 samples	3.15-4.0	0.25-0.52	59.2-61.0	[120]
(Mg, Fe)Al_3SiBO_9 (grandidierite)	AlO_5	8.7	0.95	41.0	[121]
	AlO_6-(1)/(2)	3.5/8.6	0.5/0.95	9.0/11.0	[121]
$NaCa_2Mg_4Al(Si_6Al_2)O_{22}(OH)_2$	AlO_4 (Q^3)	4.0	qp	77	[122]
(pargasite)					
$NaCa_2Mg_5Al(Si_7Al)O_{22}F_2$	AlO_4 (Q^2)	3.0	qp	76	[122]
(fluor edenite)	AlO_4 (Q^3)	5.9	qp	77	[122]

Other (non-zeolite) phosphorous containing materials

$AlPO_4$ (quartz)	AlO_4	4.2	0.35	44.8	[75]
$AlPO_4$ (tridimite)	AlO_4	0.75	0.95	39.8	[75]
$AlPO_4$ (cristobalite)	AlO_4	1.2	0.75	42.5	[75]

$Al_2PO_4(OH)_3$ (augelite)	AlO_5/ AlO_6	5.5/4.7	0.78/0.2	30/−3	[123]
$Al_2PO_4(OH)_3·H_2O$ (senegalite)	AlO_5	2.87	$0_{assumed}$	30	[123]
	AlO_6	4.09	$0_{assumed}$	1.7	[123]
$KAlP_2O_7$	AlO_6	1.2	0.25	−16	[124]
$Zn_3Al_6(PO_4)_{12}$	site 1/ site 2	1.6/1.23	0.4/0.6	49.74/47.6	[125]
Layered aluminophosphates	6 sites	1,3-5.8	0.1-1.0	−17.6-48.1	[126]
$xAl_2O_3·$ (30-x)$P_2O_5·70SiO_2$	AlO_4	4.0-6.3	qp	40.1-61.5	[127]
x=2.5-27.5% (glass)	AlO_5	4.0-6.0	qp	9.4-35.0	[127]
	AlO_6	4.0-5.0	qp	−20.4-5.0	[127]
$AlPW_{12}O_{40}$ dehydrated at 473 K	AlO_6	2.4/6.0	1/0.8	2/4	[128]
	AlO_5	7.0/8.7	0.2/0.2	24/44	[128]
	AlO_4	8.5	0.8	65	[128]
60 $NaPO_3$ 40AlF_3 glass	$Al^{(6)}$/ $Al^{(5)}$/ $Al^{(4)}$	5.1/6.0/3.3	-	−4.5/19/44	[129]
Boron containing materials					
AlB_2		0.533	-	880	[130]
$2SrO·Al_2O_3·B_2O_3$	AlO_4	4.3	0.65	83.5	[131]
$2CaO·Al_2O_3·B_2O_3$	AlO_4	6.25	0.45	79.5	[131]
$2Li_2O·Al_2O_3·B_2O_3$	AlO_4	6.0	0.45	76	[131]
$3Li_2O·Al_2O_3·2B_2O_3$	AlO_4	6.7	0.83	70	[131]
$9Al_2O_3·2B_2O_3$	AlO_4	6.8	0.1	53	[131]
	AlO_5	4.8	0.3	31	[131]
	AlO_6	6.2	0.4	10.5	[131]
$SnAlBO_4$ (mullite struture)	$AlO_{4\ or\ 5}$	11.5	0.5	20.6	[132]
	AlO_6	8.8	0.2	22.1	[132]
	$AlO_{4\ or\ 5}$	5.1	0.2	51.5	[132]
$Al_{6-x}B_xO_9$ (mullite structure)	$AlO_{4\ or\ 5}$	3.9-9.0	-	33.0-67.8	[133]
8 samples with $1 \leq x \leq 4$	AlO_6	4.0-10.5	-	5.1-21.9	[133]
$Na_2Al_2B_2O$	AlO_4	1.65	0.05	70.3	[134]
$Li_6Al_2(BO_3)_4$		6.4	0.88	69.3	[135]
Flour containing materials					
AlF_6^{3-} octahedrons, fluoroaluminates		0.065-1.58	0-0.95	−7-1	[136, 137]
AlF_3		0.213	0.0	-	[138]
α-AlF_3	AlF_6	2.8	0	−13.2	[139]
β-AlF_3	AlF_6	3.4	0	−12.5	[139]
β-$AlF_{6-x}(OH)_x$ (82 $m^2\ g^{-1}$)	AlF_6 and $AlF_5(OH)$	0.28	qp	−15.5	[140]
	$AlF_4(OH)_2$	0.61	qp	−11.7	[140]
	$AlF_3(OH)_3$	0.990	qp	−9.5	[140]
HS-AlF_3	site A/B	3.88/8.68	qp/qp	4.8/−7.9	[141]
	site C/D	6.37/5.04	qp/qp	−7.4/−7.7	[141]
$H_3AlF_6·6H_2O$	AlF_6	0.3	0.0	−2.8	[142]
$K_2AlF_5·H_2O$	AlF_6	12	0.0	0	[142]
$RbAlO_2$	5 sites	2.7-8.7	0.03-0.65	20.5-69.9	[143]
$Rb_2Al_2O_2F_2$	AlO_4	9.7	0.00	67.8	[143]
$RbAlF_4$	AlF_6	13	0.1	−4	[142]
$Rb_2AlF_5·H_2O$	AlF_6	13	0.0	0	[142]
$CsAlF_5·H_2O$	AlF_6	7.5	0.15	−10	[142]
NH_4AlF_4	AlF_6	10	0.1	−6	[142]
$KAlF_4$	AlF_6	12	0.0	−5	[142]
	AlF_6	-	-	−19.5	[144]
K_3AlF_6	AlF_6	-	-	−1.2	[144]

Tl_2AlF_5	AlF_6	-	-	−0.8	[144]
α-$BaAlF_5$	AlF_6	-	-	−13.4	[144]
β-Ba_3AlF_9	3 sites	0.14-0.51	0.07-0.85	−2-1	[145]
$Ba_3Al_2F_{12}$	AlF_6	-	-	−11.7	[144]
β-$CaAlF_5$		1.53	0.10	-	[146]
$Al_{13}Si_5O_{20}(OH,F)_{18}Cl$ (zunyite)	$Al1_{Keggin}$	2.25	1.0	72.2	[147]
	$Al1_{Pentamer}$	1.96	0.7	46.5	[147]
	$Al2_{without\ F}$	2.80	0.4	7.8	[147]
	$Al2_{with\ one\ F}$	7.08	0.4	14.0	[147]
$Al_2SiO_4F_2$ (topas)	AlF_6	1.7	0.4	0.3	[142]
Na_3AlF_6 (cryolite)	AlF_6	0.58	0.89	−0.5	[148]
	AlF_6	0.600	0.9	-	[138]
	AlF_6			−0.8	[144]
	AlF_6	2.0	0	1.4	[139]
K_2NaAlF_6 (elpasolite)	AlF_6	1.4	0	0.8	[139]
$Na_5Al_3F_{14}$	AlF_6 1/2	8.2/6.5	0/1	−1/−3	[139]
Na_2MgAlF_7 (weberite)	AlF_6	2.15	0.56	−5.4	[148]
$Na_3Al_2Li_3F_{12}$ (cryolithionite)	AlF_6	1.03	0.09	−0.5	[148]
$Na_5Al_3F_{14}$ (chiolite)	AlF_6	8.0	0.13	−2.5	[148]
	AlF_6 1/2	5.867/8.000	0.0/0.1	-	[138]
$Na_2Ca_3Al_2F_{14}$	AlF_6	0.433	0	−1.6	[149]
α-$NaCaAlF_6$	AlF_6 (i)/(ii)	3.800/2.933	0.25/0.1	−3.4/−2.2	[149]
β-$NaCaAlF_6$	AlF_6 (i)/ (ii)	1.300/0.400	0/0	−3/−3	[149]
60 $NaPO_3$ 40AlF_3 glass	$Al^{(6)}$/ $Al^{(5)}$/ $Al^{(4)}$	5.1/6.0/3.3	-	−4.5/19/44	[129]

Nitrogen containing materials

$AlO_{4-x}N_x$ (AlON) and $(Si, Al)_x(O, N)_{x+1}$ (SiAlON) materials, see [150], for ceramic [151]

SiAlON	AlO_6	-		2.8	[152]
γ-AlON	AlO_6	-	-	14	[153]
SiAlON	AlO_4	-		59	[152]
γ-AlON	AlO_4	-	-	66	[153]
AlON or Al_2O_3/AlN composite	$AlNO_3$	-	-	96	[153]
AlON or Al_2O_3/AlN composite	AlN_2O_2	-	-	96	[153]
AlON or Al_2O_3/AlN composite	AlN_3O	-	-	106	[153]
AlN	AlN_4	-	-	114-117	[153]
$Li_{0.06}Al_{2.72}O_{3.77}N_{0.23}$ (LiAlON)	AlO_6	4.83	0.61	15.35	[154]
	AlO_5N	7.77	0.61	16.89	[154]
	AlO_4	3.79	0.61	67.02	[154]
	AlO_3N	6.83	0.61	72.00	[154]
$CaMg_2AlN_3$	AlN_4	5.6	-	120	[155]

Other aluminum compounds

Al_4C_3	Al1	15.58	0	120.1	[156]
	Al2	15.83	0	111.2	[156]
Al_4C_3 (Strem/Zegen)	site 1	16.5/16.7	0.0/0.0	119.9/119.6	[157]
	Site 2	14.1/14.5	0.1/0.1	109.4/109.1	[157]
	AlOC-1	109.0/10.7		104/100.2	[157]
	AlOC-2	-	-	96.3/97	[157]
$Al(acac)_3$	AlO_6	3.03	0.15	0.0	[158]
$Al(trop)_3$		4.43	0.08	36.6	[158]
$Al(TMHD)_3$	AlO_6	3.23	0.10	1.5	[158]
Al_{13}-$(heidi)_6^{3+}$ polycation	type 1/2/3	2.4/6.0/5.2	0/0.38/0.83	12/12.5/25	[159]
$[Al_8(OH)_{14}(H_2O)_{18}](SO_4)_5{\cdot}16H_2O$	3 sites	3.2/5.75/3.1	0.8/0.1/0.5	4.8/8.4/11.0	[160]

$Al_2(OH)_2(H_2O)_8(SO_4)_2{\cdot}2H_2O$	AlO_6	4.6	0.4	3	[4]
$Al_2(OH)_4SO_4{\cdot}7H_2O$ (aluminite)	AlO_6-1/2	10.1/11.6	0.1/0.15	6.9/6.4	[4]
$NaAlCO_3(OH)_2$ (dawsonite)		6.70	0.45	10	[161]
$Ca_6Al_2S_3H_{64}O_{50}$	AlO_6	0.36	0.19	13.1	[30]
$Ca_4Al_2SH_{24}O_{22}$	AlO_6	1.7	qp	11.8	[30]
$Ca_4Al_6O_{12}SO_4$ (ye'elimite)	8 sites	2.5-7.6	0.07-0.76	73.6-76.1	[162]
$Ca_6[Al(OH)_6]_2(SO_4)_3{\cdot}26H_2O$ (ettringite)	Al(1)	0.391	0.164	13.08	[163]
	Al(2)	0.337	0.174	13.51	[163]
$Ca_4[Al(OH)_6]_2(CrO_4){\cdot}12H_2O$	AFm mono	1.10	0.16	11.26	[164]
$Ca_4[Al(OH)_6]_2(CrO4)_{0.5}(OH){\cdot}12H_2O$	AFm hemi	1.04	0.25	11.26	[164]
$Ca_6[Al(OH)_6]_2$-$(CrO_4)_3{\cdot}24H_2O$	AFt Al(1)/Al(2)	0.353/0.359	0.293/0.245	13.05/13.44	[164]
$KAl_3(SO_4)_2(OH)_6$ (alunite)	Al1	10.40	0.05	4.7	[165]
sample A01 from 6 samples	Al_{I1}/ Al_{I2}	-	-	−3.3/0.1	[165]
$KAl(SO_4)_2{\cdot}12H_2O$	AlO_6	0.400	0.00	−4.1	[36]
$NH_4Al(SO_4)_2{\cdot}12H_2O$	AlO_6	0.456	0.00	−0.4	[36]
ZnAl−CO_3 , layered double hydroxides synthesized at different pH					
	Al-1	1.3-1.4	0.67-0.71	15.1-15.2	[166]
	Al-2	3.1-3.3	0.61-0.70	13.4-15.0	[166]
Host compounds					
Ca_2SiO_4 larnite (belite)	Al_{IV}	7.1	0.33	96.1	[167]
	Al_{VI}	4.5	0.4	10.1	[167]
	AlO_4	5.8	0.54	94	[168]
MgO periclase	AlO_6	<0.45	-	15.8	[168]

Table 8.2. ^{23}Na, quadrupole coupling constant $C_\mathrm{Q} = e^2qQ/h$, the asymmetry parameter η, and the isotropic value of the chemical shift δ (referred to 1.0 M NaCl [3]) for the ^{23}Na NMR of powder inorganic compounds at ambient temperature. An asterisk denotes values of the chemical shift, which were originally referenced to solid NaCl. They are here transformed by the equation δ(referenced to 1M NaCl) = δ(referenced to solid NaCl) + 7.2 ppm. A specification after the reference is a hint to a special selection of data from the source. The acronym "qp" appears in the column for η, if the column C_Q contains the quadrupolar product parameter $P_\mathrm{Q} = C_\mathrm{Q}\sqrt{1+\frac{\eta^2}{3}}$ instead of C_Q.

Compound	site	C_Q/ MHz	η	δ /ppm	Refs.
Silicates without Al					
Na_2SiO_3		1.5	0.7	21.6	[169]
		1.4	0.7	22.1	[170]
		1.46	0.71	22.65*	[171]
$Na_2SiO_3{\cdot}9H_2O$		1.110	0.63	3.7	[172]
$Na_2SiO_2(OH)_2{\cdot}8H_2O$		1.14	0.56	3.53*	[171]
$Na_2SiO_2(OH)_2{\cdot}4H_2O$	Na 1/2	1.80/2.83	0.75/0.17	9.00*/9.50*	[171]
α-$Na_2Si_2O_5$		1.820	1	17.1	[169]
		1.79	1.0	16.9	[173]
	132.3 MHz	1.82	1	17.1	[174]
$Na_2Si_2O_5$, SKS-5, layered, hydrated, site 2		1.6	0.8	0.8	[175]
	site 3/4	0.5/1.2	qp/0.2	−1.0/−0.7	[175]
$Na_2Si_2O_5$, SKS-6, layered, hydrated, site 5/6		1.7/1.6	0.5/0.8	−1.1/0.8	[175]
	site 7/8	1.2/0.6	0.2/ qp	−1.0/−1.0	[175]
δ-$Na_2Si_2O_5$	Na_b 5 c	2.4	1	10	[169]
	site B	2.4	1.0	8.4	[176]
	(2) 132.3 MHz	2.4	1	9.1	[174]
	Na_c 6 c	1.1	0.3	15.9	[169]
	site A	1.1	0.3	15.4	[176]
	(1) 132.3 MHz	1.16	0.25	16.1	[174]
β-$Na_2Si_2O_5$	Na(1)	2.29	0.85	15.6	[173]
	(2) 132.3 MHz	2.5	0	18.7	[174]
	Na(2)	2.20	0.55	9.4	[173]
	(1) 132.3 MHz	2.22	0.55	9.4	[174]
$Na_2O{\cdot}4SiO_2{\cdot}5H_2O$ (makatite)	site 1/2/3	1.3/1.5/1.4	0.6/0.4/0.6	0/1/8	[177]
$Na_2O{\cdot}8SiO_2{\cdot}9H_2O$ (octosilicate)		0.48	-	−0.7	[177]
$Na_2O{\cdot}8SiO_2{\cdot}xH_2O$ (octosilicate dried)		2.4	0.7	−6	[177]
$NaSi_2O_5{\cdot}3H_2O$ (kanemite)	site 1/2/3	1.7/2.0/0.6	0.7/0.7/-	0/2/−1	[177]
$Na_2Si_{14}O_{29}{\cdot}11H_2O$ (magadiite)		1.3	0.6	0	[177]
$Na_2Si_{22}O_{41}(OH)_8{\cdot}6H_2O$ (kenyaite)		0.60	-	−0.5	[177]
$Na_8Si_{12}O_{28}{\cdot}4H_2O$ (Mu-11)	(A)/ (B)	2.7/2.9	0.4/0.7	1/0.7	[178]
$Na_2BaSi_2O_6$	Na 1/Na 2	2.10/2.96	0.75/0.1	25.0/5.4	[173]
$Na_2H_2SiO_4{\cdot}8H_2O$		1.11	0.72	3.8*	[179]
$Na_2H_2SiO_4{\cdot}4H_2O$	(1)/(2)	1.80/2.83	0.75/0.17	9.0*/9.5*	[179]
$10Na_2O$ $10CaO$ $21B_2O_3$ $8Al_2O_3$ $51SiO_2$ (glass)		2.8	0.7	−7.9	[180]
$43.1Na_2O$ $56.9SiO_2$ (glass)		3.0	-	7.5	[181]
Soda-lime silicate glass		1.9	-	4.7	[182]
$Na_4Ti_2Si_8O_{22}{\cdot}5H_2O$ (penkvilksite)		3.30	0.45	4.3	[183]
Na_3F $SnSi_3O_9$ (stannosilicate)	(A)/ (B)	3.0/3.7	0.55/0.68	12.5/9	[184]

Zeolites and zeolite-like materials

Na-A (dehydrated) near to 6- rings		5.8	0	-	[185]
near to	4, 8-rings	3.2	0.9	-	[185]
Na-LSX (93.2 Na/u.c.)	SI	1.2	0.1	0	[186]
(dehydrated)	SI’	5.9	0.1	−6	[186]
	SII	5.1	0.2	−12	[186]
	SIII’(1,2)	2.2	0.5	−13	[186]
	SIII’(3)	2.0	0.8	−1	[186]
Na-LSX (dehydrated)	SI	1.1	0.5	5.2*	[187]
	SI’	5.8	0.0	−12.8*	[187]
	SII	5.0	0.0	−8.8*	[187]
	SIII’(1,2)	2.2	0.7	−10.8*	[187]
	SIII’(3)	1.2	0.9	−22.8*	[187]
39Li86NaLSX (dehyd.)	SI	1.1	0.5	5.2*	[187]
	SI’	5.4	0.0	−11.8*	[187]
	SII	4.8	0.1	−8.8*	[187]
	SIII’	0	-	−21.8*	[187]
84Li16NaX (dehydr.)	SIII’	0	-	−22.8*	[187]
Na-X (83.5 Na/u.c.)	SI	1.2	0.1	−1	[186]
(dehydrated)	SI’	5.9	0.1	−10	[186]
	SII	4.8	0.2	−16	[186]
	SIII’(1,2)	2.6	0. 5	−17	[186]
	SIII’(3)	2.0	0.8	−11	[186]
Na-X (Si/Al=1.23) MAS/DOR	SI	0/-	0/-	1.2/-*	[188]
(dehydrated)	SI’(1)	5.2/5.0	0/0	−11.8/−12.8*	[188]
	SI’(2)	-/3.6	-/0	-/−20.8*	[188]
	SII	4.6/4.5	0/0.1	−7.8/−10.8*	[188]
	SIII’(1,2)	2.6/3.0	0.7/0.5	−5.8/−3.8*	[188]
	SIII’(3)	1.6/1.9	0.9/0.9	−21.8/−23.8*	[188]
Zeolite Na-X (Si/Al=1.24)	SI	1.4	0	−2.7	[189]
(dehydrated)	SI’	5.4	0	−20	[189]
	SII	4.9	0	−10	[189]
	SIII’(1,2)	3.0	0.5	−11	[189]
	SIII’(3)	2.1	0.9	−21	[189]
Na-Y (Si/Al=2.5) (dehydrated)	SI	0	0	−4.8*	[188]
Na-Y (Si/Al=2.6) (dehydrated)	SI	1.2	qp	−5	[190]
	SI	1.2	0	−1.5	[189]
	SI’	4.8	0	−12	[189]
	SII	3.9	0	−8	[189]
Na-Y (Si/Al=2.7) (dehydrated)	SI	1.2	$0.5_{assumed}$	−3.3*	[191]
	SI’	2.6	$0.5_{assumed}$	−5.4*	[191]
	SII	3.8	$0.5_{assumed}$	−13.0*	[191]
Na-Y (Si/Al=8.6) (dehydrated)	two SI sites	1.1/1.2	$0.5_{assumed}$	−1.2/−6.1*	[191]
	in sodalite c.	1.6	$0.5_{assumed}$	−18.1*	[191]
	SII	3.5	$0.5_{assumed}$	−11.7*	[191]
Na-Y (Si/Al=2.56) (dehydrated)	SI	0.4	qp	−6	[192]
	SI'/SII'	2.3	qp	−12	[192]
	SII	4.2	qp	−4	[192]
	SIII	4.7	qp	5	[192]
Na-Y (Si/Al=2.6) (dehydrated)	SI	1.2	0.1	−3	[186]
	SI’	4.8	0.2	5	[186]
	SII	3.9	0.2	−7	[186]

HNa-Y (21.3 Na/u.c.) (dehyd.)	SI	1.2	0.1	−3	[186]
	SI’	4.9	0.2	5	[186]
	SII	3.8	0.2	−7	[186]
HNa-Y (13.3 Na/u.c.) (dehydr.)	SI	1.2	0.1	−3	[186]
	SI’	4.9	0.3	5	[186]
	SII	3.8	0.2	−7	[186]
HNa-Y (2.7 Na/u.c.) (dehydr.)	SI	1.2	0.1	−3	[186]
	SI’	4.8	0	3.2*	[188]
	SII	3.9	0	−4.8*	[188]
$Ca_{19}Na_{16}$-Y (Si/Al=2.56) (dehy.)	SI	0.4	qp	−2	[192]
	SI’/SII’	2.3	qp	−4	[192]
	SII	4.6	qp	−3	[192]
	SIII	5.0	qp	3	[192]
75Na25K CHA (dehydr.)	SIIa	5.7	qp	−8.1*	[193]
	SIII'a	4.1	qp	−17.5*	[193]
	SIII’b	1.7	qp	−2.8 to −15.6*	[193]
31Li47Na22K CHA (dehy.)	SI	1.2	qp	6.2*	[193]
	SIIa	4.9	qp	−6.8*	[193]
	SIIb	5.3	qp	−4.8*	[193]
	SIII'a	4.1	qp	−17.8*	[193]
	SIII’b	2.0	qp	−3.8 to −13.1*	[193]
64Li13Na23K CHA (dehy.)	SIII'a	4.4	qp	−15.8*	[193]
Na-EMT (Si/Al=3.7) (dehydr.)	SI	1.0	qp	−6.5	[190]
Na-MOR (Si/Al=7.1) (dehydr.)	12-ring	2.0	qp	−14	[190]
	sidepockets	3.1	qp	−24	[190]
Na-MOR (Si/Al=6.49) (dehydr. 773 K) (18.8 T)					
	Na VI	2.3	0.56	−12.4	[194]
	Na IV	2.9	0.46	−19.2	[194]
	Na I	2.9	0.56	−24	[194]
Na-FER (Si/Al=27)	Na I	4.3	0.6	−1.5	[195]
	Na IIa	2.2	0.6	−15.5	[195]
	Na IIb	2.1	0.6	−19.5	[195]
	Na III	3.6	0.6	−22.5	[195]
Na-ZSM-5 (Si/Al=18) (dehydr.)	10-ring	2.0	qp	−18	[190]
SSZ-13 zeolite (Si/Al=21)	SIIa0/SIIa1	3.1/3.9	0.6/0.2	−11.2/−7.4	[196]
	SIII’a1/SIII’b	2.7/1.8	1/0.6	−20.4/−10.0	[196]
K,Na-JBW (Na_2Rb-$[AlGeO_4]_3{\cdot}H_2O$)		1.8	1.1	5	[92]
$Na_2Al_2Si_3O_{10}{\cdot}2H_2O$ (natrolite)		1.82	0.6	8.18	[197]
$NaAlSi_3O_8$ (albite)		2.69	0.25	−7.1	[198]
$NaAlSi_2O_6$		3.3	0.25	11.0	[173]
Na,K $AlSi_3O_8$ (feldspar)	8 samples	2.136-1.160	0.6-0.7	−20.1-−24.7	[120]
$Na_8Al_2Be_2Si_8O_{24}Cl_2$ (tugtupide)		1.41	0.44	7.7	[117]
$Na(Na_2)Mg_5Si_8O_{22}(OH)_2OH$	M(4)	3.9	0.49	9.3	[122]
(HSMC)	channel (A)	2.9	0.26	5.5	[122]
$Na_{8.0}[AlSiO_4]_6Cl_{1.8}{\cdot}0.4\ H_2O$ (NaCl-sodalite)		0.20-0.45	qp	−8.8	[95]
$Na_{7.7}[AlSiO_4]_6Br_{1.8}{\cdot}0.4\ H_2O$ (NaBr-sodalite)		0.72	0.12	−9.9	[95]
$Na_{7.8}[AlSiO_4]_6I_{1.7}{\cdot}0.4\ H_2O$ (NaI-sodalite)		1.73	0.06	−20.6	[95]
$Na_8Cl_2[Al_6Si_6O_{12}]$ (NaCl-sodalite)		≈0	$0.67_{assumed}$	6.3	[199]
$Na_8B_2[Al_6Si_6O_{12}]$ (NaB-sodalite)		1	$0.67_{assumed}$	8.5	[199]
$Na_8I_2[Al_6Si_6O_{12}]$ (NaI-sodalite)		1.9	$0.67_{assumed}$	9.3	[199]
$Na_8Cl_2[Al_6Si_6O_{24}]$ (NaCl-sodalite)		0.5	qp	6.1	[93]
$Na_8Br_2[Al_6Si_6O_{24}]$ (NaBr-sodalite)		0.7	qp	7.2	[93]

$Na_8I_2[Al_6Si_6O_{24}]$ (NaI-sodalite)		1.8	qp	7.3	[93]
$Na_8[Al_6Si_6O_{24}]\cdot(H_3O_2)_2$ (basic sodalite)		0.8	qp	5	[96]
Na_8Br_2 $[Al_6Si_6O_{24}]\cdot$ (basic sodalite)		0.7	qp	7.5	[96]
$Na_6[Al_6Si_6O_{24}]\cdot(4H_2O)_2$ (hydro sodalite)		1.1	qp	−0.1	[96]
Na_8Br_2 $[Al_6Si_6O_{24}]$		0.7	qp	7.4	[96]
$Na_6[Al_6Si_6O_{24}]$ (dry sodalite)		5.6	qp	-	[96]
Na_8Br_2 $[Al_6Si_6O_{24}]$ (dry sodalite)		0.7	qp	7.4	[96]
$Na_6[AlSiO_4]_6$ (anhydrous sodium sodalite)		5.90	0.10	10.2*	[171]
$Na_8[AlSiO_4]_6(OH)_2$ (hydroxosodalite, dehyd.)		2.00	0.10	3.2*	[171]
$Na_8[AlSiO_4]_6(OH)_2\cdot 2H_2O$ (hydroxosodalite)		1.55	0.16	−1.2*	[171]
Na-nitride sodalite		1.00	0.18	0.4*	[179]
$Na_8Cl_2(AlSiO_4)_6$ (blue sodalite)		0.081	0.35	95 ?	[94]
$Na_8Si_{12}O_{28}\cdot 4H_2O$ (Mu-11)	(A)	2.7	0.4	1	[178]
	(B)	2.9	0.7	0.7	[178]
$Na_6Zn_2[AlSiO_4]_6(SO_4)_2$		1.9	qp	1	[98]
$NaAlSi_2O_6$ (jadeite)		3.30	0.25	11.0	[173]
$(Na_4BH_4)^{3+}$ sodalite	AlSi	8.82	0	−6.61	[200]
	GaSi	6.41	0	−1.31	[200]
	AlGe	6.75	0.22	−1.60	[200]
Other (non-zeolite) aluminosilicates					
Al_2O_3-B_2O_3-SiO_2-Na_2O glasses		2.5-3.5	qp	−3–−12	[100]
Soda-lime aluminosilicate glass		1.8	-	−6.9	[182]
$[Na_2O\cdot Li_2O]_{0.46}[0.16Al_2O_3\cdot 0.84P_2O_5]_{0.54}$ glass					
	$Al(OP)_6$	2.4-2.6	qp	−10–−11	[201]
	$Al(OP)_5$	3.3-4.0	qp	16-18	[201]
	$Al(OP)_4$	3.4-4.2	qp	46-49	[201]
Nitrogen containing materials					
$NaNO_3$		-	-	−7.3	[202]
		0.337	0.00	−8.0	[36]
$NaNO_2$		1.09	0.11	−0.1	[36]
NaN_3		-	-	−3.5	[202]
		0.297	0.12	−3.8	[36]
Other (non-zeolite) phosphorus containing materials					
$Na_3P_3O_9$	Na 1/Na 2	2.20/1.57	0.70/0.55	−7.60*/1.60*	[171]
$NaPO_3$ glass		2.3	-	−4.2	[129]
60 $NaPO_3$ 40AlF_3 glass		2.2	-	−7.3	[129]
$Na_5P_3O_{10}$ H_2O	1/2	1.74/1.97	0.29/0.85	−0.55/−5.71	[203]
	3/4	2.09/2.40	0.81/0.51	−9.09/2.20	[203]
	5	1.69	0.26	−4.20	[203]
$Na_5P_3O_{10}$	Na 1/ Na 2	4.65/3.06	0.40/0.17		[204]
	Na 3	4.65	0.40		[204]
$Na_2P_2O_7$ H_2O	Na 1/ Na 2	1.37/0.48	0.92/0.99	-	[204]
$Na_4P_2O_7$	Na 1/ Na 2	2.08/2.30	0.26/0.70	5.52/1.96	[205]
	Na 3/ Na 4	2.90/3.22	0.47/0.56	10.41/6.36	[205]
$Na_4P_2O_7$ $10H_2O$		-	-	1.5	[202]
$Na_3HP_2O_7$ H_2O	Na 1/ Na 2	2.55/3.60	0.15/0.20	4.0/1.0	[205]
	Na 3	3.1	0.1	6.5	[205]
Na_2HPO_4	Na 1/ Na 2	0.210/0.325	0.18/0.7	−1.4/−2.5	[206]
	Na 3	0.589	0.26	−1.1	[206]

$NaH_2PO_4{\cdot}2H_2O$		1.19	0.46	2.40*	[171]
$NaH_2PO_4{\cdot}H_2O$		1.22	0.26	−3.49*	[171]
NaH_2PO_4	Na 1/ Na 2	1.59/2.35	0.46/0.94	-	[204]
$CaNa_4(P_3O_9)_2$	50%/50%	1.405/2.191	0.60/0.69	−3.3/−13.3	[207]
$NaMg(PO_3)_3$	43%/26%	2.67/2.57	0.34/0.47	0.0/−4.3	[208]
	31%	2.72	0.59	−9.8	[208]
$NaZn(PO_3)_3$	41%/28%	2.50/2.66	0.38/0.51	0.0/−4.1	[208]
	31%	2.67	0.59	−9.9	[208]
$NaCa(PO_3)_3$	93%/7%	2.15/0.62	0.88/0.99	3.73/−5.58	[209]
$NaSr(PO_3)_3$		2.38	0.70	2.74	[209]
$NaPO_3$ glass		2.1	qp	−3.4	[210]
$NaPO_3$ glass		2.52	qp	−5.1	[211]
$Na_{0.2}Li_{0.8}PO_3$ glass		2.65	qp	−7.0	[211]
$Na_{0.2}Ag_{0.8}PO_3$ glass		2.41	qp	−5.5	[211]
$Na_{0.22}K_{0.78}PO_3$ glass		2.34	qp	−1.0	[211]
$Na_{0.22}Rb_{0.78}PO_3$ glass		1.93	qp	−0.6	[211]
$Na_{0.19}Cs_{0.81}PO_3$ glass		2.52	qp	−1.7	[211]
$Na_{0.2}Li_{0.8}PO_3$ glass		2.65	qp	−7.0	[211]
$NaPO_3$ −WO_3 glass		2.0	qp	−14.9	[210]
$NaPO_3$− GeO_2 glass		1.8	qp	−4.5	[212]
$(M_2O)_{1/3}[(Ge_2O4)_x(P_2O_5)_{1-x}]_{2/3}$ glass M = Na, K x = 0.0, 0.4, 0.8		1.3/1.7/1.6	qp	−5.7/−8.3/−4.0	[213]
60$NaPO_3$−40MoO_3 glass		2.0	qp	−14.3	[214]
$NaGe_2(PO_4)_3$	site 1/2/3	3.45/3.2/-	0.01/0.02/-	−11.5/−21.7/−37.4	[215]
$Na_{1.4}Al_{0.4}Ti_{1.6}(PO_4)_3$		1.4614	-	−8.3	[216]
$Na_{1.4}Al_{0.4}Zr_{1.6}(PO_4)_3$		1.1200	-	−14.6	[216]
$Ca_{10}K_{0.5}Na_{0.5}(PO_4)_7$		2.4	0.13	−8.8	[217]
$NaSn_2(PO_4)_3$	Na 1/Na 2	2.3/2.5	0/0	-	[218]
$Na_3Fe_3(PO_4)_4$ (layered)	Na 1/Na 2	1.55/1.57	0.03/0.48	277.5/143.0	[219]
$[Na_2O{\cdot}Li_2O]_{0.46}[0.16Al_2O_3{\cdot}0.84P_2O_5]_{0.54}$ glass		1.3	qp	−6	[201]
$Ca_{10}K_{0.5}Na_{0.5}(PO_4)_7$		2.4	0.13	−8.8	[217]
$Ca_{10}Na(PO_4)_7$		2.48	0.2	−5	[220]
$Na_3MnPO_4CO_3$ (sidorenkite)	1/2	1.2/4.4	0.0/0.5	−168/569	[221]
$Na_6[P_2Mo_5O_{23}]{\cdot}7H_2O$	Na(a)/ Na(d)	3.15/2.49	qp/ qp	−1.6/−11.0	[222]
	Na(f)	0.88	qp	−2.1	[222]
HNaPW (hydrated)	1/2	2.0/2.7	1.0/0.0	3/4	[223]
$Na_{15}[(PO_2)_3PNb_9O_{34}]{\cdot}22H_2O$	5 sites	0.63-2.2	0-1	−8.4-3.1	[224]
$Na_5B_2P_3O_{13}$	5 sites	1.54-2.83	0.02-0.85	−7.7-9.2	[225]
Others					
Na_4Si_4 (2 at% P-doped)	Na-Si	1.25	1.0	56.7	[226]
	Na-Si	2.31	0.15	49.5	[226]
	Na-P	2.0	0.1	53.3	[226]
Cs_7NaSi_8		5.36	0	72.2	[227]
Rb_7NaSi_8		5.66	0	157.2	[227]
Na_2O		≈0	-	55.1	[228]
Na_2O_2	2 sites	-	-	4.8 and 9.9	[229]
Na_3OCl		11.34	0.0	-	[228]
NaOH	5-coord.	3.59	0.07	21.1	[230]
		3.5	0.00	19.4*	[171]
$NaOH{\cdot}2H_2O$		2.20	0.70	12.2*	[171]
$NaZrO_3$	Na 1/ Na 2	2.52/2.08	0.67/0.05	15.0/27.0	[231]

	Na 3	4.20	0.27	19.5	[231]
$Na_2ZrSi_2O_7$ (parakeldyshite)	Na 1/Na 2	1.5/2.8	1.0/0.85	0.0/2.0	[232]
$Na_2ZrSi_4O_{11}$ (vlasovite)	Na 1/Na 2	1.65/4.70	0.25/0.0	−4.5/−3.0	[232]
$NaZrSi_6O_{15}·3H_2O$ (elpidite)	Na 1/Na 2	2.05/2.65	0.50/0.75	−7.0/−1.0	[232]
$Na_4Zr_2Si_3O_{12}$	Na 1/Na 2	2.30/3.10	0.85/0.30	−7.0/9.0	[232]
Na_3GaF_6		1.49	0.4	0.1	[233]
NaF		-	-	7.9	[202]
	octahedr.	≈0	-	7.2	[230]
NaCl		-	-	7.9	[202]
	octahedr.	≈0	-	7.2	[230]
NaBr		-	-	6.0	[202]
	octahedr.	≈0	-	5.1	[230]
NaI				−2.7	[202]
	octahedr.	≈0	-	−3.2	[230]
$NaIO_4$		-	-	−12.5	[202]
Na_2S	tedrahedr.	≈0	-	49.7	[230]
Na_2S	site 1	0	-	49.8	[234]
β-Na_2S_2	site 1/site2	≈0/≈0	-/-	8.5/5.9	[234]
Na_2S_4	site 1/site2	1.03/1.71	0.9/0.7	8.9/3.1	[234]
α-Na_2S_5	site 1/site2	1.87/1.52	0.5/0.3	10.5/0.8	[234]
α-$NaVO_3$	Na 1/ Na 2	1.5/0.765	0.58/0.06	−15.5/−4.8	[235]
β-$NaVO_3$		1.42	0.27	−10.3	[235]
Na_2SO_4		2.60	0.58	−1.3*	[171]
Na_2SO_3	Na 1/ Na 2	1.06/0.33	0.00/0.00	-	[204]
	Na 3	1.14	0.00	-	[204]
$NaAlO_2$		2.15	0.60	26.2*	[171]
$Na[Al(OH)_4]$		3.10	0.00	5.9	[236]
$NaAl_9O_{14}$	1/2	2.15/2.65	0.4/0.2	−15.6/−14.6	[38]
$Na_2Al_2B_2O$	Na 1/Na 2	1.9/0.33	0.1/0	5.5/−7.1	[134]
Na_2B_{29}	50%/50%	2.4/2.2	qp/ qp	10.2/16.9	[237]
$NaBO_2$		1.19	0.24	2.1	[135]
		1.2	0.09	1.8	[238]
$Na_4B_2O_5$	Na 1/Na 2	2.2/3.0	1.0/0.5	19.6/14.4	[238]
$Na_2O·4B_2O_3$	Na 1/Na 2	4.1/2.0	0.18/0.35	3.4/ −11.4	[238]
$NaBO_2·2H_2O$		1.530	0.80	10.6	[172]
$Na_2B_4O_7$	62%/20%	2.65/1.8	0.91/0.9	−9.9/−12.0	[135]
	18%	1.8	0.1	−4.9	[135]
$Na_2B_4O_7·10H_2O$ (borax)	Na 1/Na 2	0.541/0.849	0.499/0.143	-	[239]
$Na_2B_4O_7·5H_2O$ (tincalconite)	Na 1/Na 2	0.539/0.785	0.741/0.0	-	[239]
	Na 3	1.299	0.0	-	[239]
$NaCa[B_5O_6(OH)_6]·5H_2O$ (ulexite)		0.07	-	7.1	[240]
$H_{15}[Na_4(V_{12}B_{32}O_{84})]13H_2O$ (polyoxovanadate)	4 sites	0.5-1.8	0.5	−6-15	[241]
$NaSnO_3·3H_2O$		1.760	0.00	12.8	[172]
$NaTeO_4·2H_2O$		2.240	0.37	12.5	[172]
$Na_2Te_4O_9$	Na 5/Na6	4.4/3.6	0.08/0.12	−3/5	[242]
Na_2TeO_3	Na 1/Na2	1.84/1.36	0.08/0-12	5.8/17.0	[242]
$NaNbO_3$ (polar phase)	Na 1/ Na 2	2.4/1.2	qp/ qp	1.5/−5.1	[243]
$NaNbO_3$ (perovskite)	MAS	1.3	0.9	−3.0	[244]
$Li_{0.05}Na_{0.95}NbO_3$	Na 1/ Na 2	1.1/2.3	qp/ qp	−4.6/−0.6	[245]
$NaNbWO_6$	19%/81%	0.4/1.4	0.5/-	−6.5/−18	[246]
$NaTaO_3$ (perovskite)	Na 1/Na 2	2.1/1.0	0.0/0.9	−0.5/−4.5	[244]
Na_2CrO_4	Na 1/Na 2	2.78/0.5	0.57/ qp	−12.8*/−6.7*	[171]

$NaClO_4$		-	-	−20.4	[202]
		0.80	0.35	−18.3*	[171]
$NaClO_4 \cdot H_2O$	Na 1/Na 2	1.71/1.48	0.20/0.10	−4.5*/−5.2*	[171]
$Na_{1-x}Ge_{3+z}$ ($Na_{0.72}Ge_{3.13}$)	Na6	-	-	20.5	[247]
	Na5(1)/(2)	0.473/0.414	0.25/0.23	4.5/2.4	[247]
$Na_2Ge_2O_5$		2.3	1.0	14.5	[248]
$32Na_2O \cdot 68GeO_2$ (glass)		3.2	qp	7.9	[248]
$14Na_2O \cdot 86GeO_2$ (glass)		2.5	qp	−4.1	[249]
Na_2GeO_3		1.3	0.8	22.6	[238]
$Na_4Ge_9O_{20}$		2.7	0.54	−2.1	[238]
$Na_2Ge_4O_9$		2.4	0.7	−6.4	[238]
Na_2MoO_4		2.59	0.00	3.2	[250]
$Na_2MoO_4 \cdot 2H_2O$	Na(1) octah.	0.875	0.23	−1.4	[250]
	Na(2) trig.	2.68	0.08	4.0	[250]
$60NaPO_3$-$40MoO_3$ (glass)		2.0	qp	−14.3	[214]
Na_3UO_4	site A/B/C	3.4/4.0/2.5	qp	47/18/13	[251]
	site D/E/F	2.6/2.2/2.4	qp	2/−2/−16	[251]
$NaUO_3$		1.7	0.5	−29.2	[252]
Na_4UO_5		3.2	0.2	15.1	[252]
$Na_2U_2O_7$	1/2	1.4/2.0	qp/ qp	−19/−14.1	[252]
Na_2WO_4		2.49	0.00	4.5	[250]
$Na_2WO_4 \cdot 2H_2O$	Na(1) octah.	0.88	0.35	−0.9	[250]
	Na(2) trig.	2.7	0.09	6.3	[250]
Na_2WO_4	(A)	5.2	0.0	−4.0	[253]
	(B)/(C)	small/ small	-	−6/−14	[253]
$[Na_2S]_{2/3}[(B_2S_3)_{1/2}(P_2S_5)_{1/2}]_{1/3}$ (glass)		1.6	qp	3.8	[254]
Na_3AlF_6 (cryolite)	CN 6	0.83	0.62	2.6	[148]
	Na1	0.840	0.6	2	[138]
	CN 8 site 1	1.43	0.27	−8.4	[148]
	Na2	1.430	0.3	−9	[138]
$Na_5Al_3F_{14}$ (chiolite)	Na1/ Na2	1.480/3.180	0.0/0.1	−24/−9	[138]
Na_2MgAlF_7 (weberite)	CN 8 site 1/2	2.48/3.24	0.08/0.26	−28.6/−10.4	[148]
$Na_2Ca_3Al_2F_{14}$		3.360	0	5.2	[149]
α-$NaCaAlF_6$	(i)/ (ii)	2.340/1.360	0.25/0.1	2.0/−1.6	[149]
β-$NaCaAlF_6$		1.200	1	7	[149]
$NaCoO_2$		3.98	0.02	48	[255]
Na_3AlH_6 doped/non-doped site	Na1	0.50/0.49	0.6/0.7	23.5/23.3	[53]
Na_3AlH_6 doped/non-doped site	Na2	0.93/0.93	0.4/0.4	−8.8/−8.9	[53]
Na_2LiAlH_6		<0.1	-	−17.9	[53]
$NaAlH_4$		0.15	0.2	−9.2	[53]
NaH		<0.1	-	18.2	[53]
$NaHCO_3$				−5.4	[202]
$20Na_2CO_3$ 80γ-Al_2O_3	Na1/Na2/Na3	1.24/2.12/2.45	qp	5.12/0.12/-6,00	[256]
$NaAlCO_3(OH)_2$ (dawsonite)		3.64	0.56	2	[161]
$Na_2C_2O_4$		2.43	0.75	-	[204]
Na_3C_{60}		3.3	0.08	17.2	[257]

Table 8.3. ^{17}O, quadrupole coupling constant $C_\mathrm{Q} = e^2qQ/h$, the asymmetry parameter η, and the isotropic value of the chemical shift δ (referred to D_2O [3]) for the ^{17}O NMR of inorganic powder compounds at ambient temperature. For organic compounds, we refer to Wu [258]. Paramagnetic systems such as battery materials are not included. The latter in particular have recently been successfully investigated using ^{17}O NMR, see Grey and coworkers [259, 260]. The last reviews concerning solid-state ^{17}O NMR investigations of inorganic material were presented by Asbrook *et al.* [261], Asbrook and Smith [262], and Gerothanassis [263]. First natural abundance ^{17}O NMR spectra of diamagnetic MOFs were presented by Carnevale *et al.* [264]. The data in the table, which were published in the years 1989-2000, were compiled by Pingel [265]. Sites nb O and br O denote non-bridging and bridging oxygen atoms, respectively. A specification after the reference is a hint to a special selection of data from the reference. The acronym "qp" appears in the column for η, if the column C_Q/ MHz contains the quadrupolar product parameter $P_\mathrm{Q} = C_\mathrm{Q}\sqrt{1+\frac{\eta^2}{3}}$ instead of C_Q.

Compound	site	C_Q/ MHz	η	δ /ppm	Refs.
Aluminum hydroxides, aluminates					
AlO(OH) (boehmite)	OAl_4	1.20	0.1	70	[266]
	OAl_4	1.15	0.13	70.0	[36]
	Al_2OH	5.0	0.5	40	[266]
$Al(OH)_3$ (bayerite)	Al_2OH	6.0	0.3	40	[266]
α-Al_2O_3 (corundum)	OAl_4	2.17	0.55	75	[266]
	OAl_4	2.13	0.50	72	[14]
	OAl_4	< 2.4	-	66	[267]
γ-Al_2O_3 nanoparticles	AlOH	6.1	0.42	39	[268]
	OAl_3	2.6	0.32	56	[268]
	OAl_4 surface	1.3	0.35	72	[268]
	OAl_4 subsurf.	1.2	0.22	61	[268]
γ-Al_2O_3	OAl_4	1.8	qp	73	[266]
	site 1	2.5	-	56.7	[269]
	site 2	0.6	-	68.6	[269]
	site 3	1.1	-	81.0	[269]
	Site A−E			50−80	[270]
	AlO_4	3.5	qp	77.5	[271]
	AlO_5	4.5	qp	37.2	[271]
	AlO_6	4.3	qp	14.0	[271]
BaO/ γ-Al_2O_3	AlO_4	4.5	qp	77.4	[271]
	AlO_5	3.1	qp	34.0	[271]
	AlO_6	4.2	qp	13.7	[271]
η-Al_2O_3	OAl_4	1.6	qp	73	[266]
δ-Al_2O_3	OAl_4	1.6	qp	72	[266]
θ-Al_2O_3	OAl_4	1.2	qp	72	[266]
	OAl_3	4.0	0.6	79	[266]
$Al_{13}O_{40}$ cluster	AlOAl	1.2	0	50	[272]
$NaAlO_2$	AlOAl	1.81	qp	30.9	[273]
$CaAl_2O_4$	nb O	≈1.9	qp	≈141	[273]
	8 br O	1.3-1.9	qp	57.3-86.8	[274]
$CaAl_4O_7$	O1	1.9	0.7	71.6	[274]
	O2 or O3	1.8	0.5	61.5	[274]
	O3 or O2	2.1	0.5	56.8	[274]
	O4	2.5	0.4	40.6	[274]
$LaAlO_3$		1.6 (max.)		170.2	[275]
$Y_3Al_5O_{12}$	OY_2Al_2	1.49	0.99	142	[14]
$Y_4Al_2O_9$	9 sites	1.49	qp	126-372	[14]

$YAlO_3$	$O_{(1)}Y_3Al_2$	1.57	1.00	143	[14]
	$O_{(2)}Y_3Al_2$	1.65	0.35	165	[14]
Silicates without aluminum					
Siliceous zeolite Y, Sil-Y	SiOSi O1	5.1	0.3	42.3	[276]
dehydrated	SiOSi O2	5.39	0.2	37.2	[276]
	SiOSi O3	5.14	0.1	47.3	[276]
	SiOSi O4	5.28	0.2	34.8	[276]
Siliceous ferrierite, Sil-FER	SiOSi 1/2	5.62/5.22	qp	43.1/41.6	[277]
dehydrated	SiOSi 3/4	5.35/5.29	qp	40.7/39.6	[277]
	SiOSi 5/6	5.38/5.27	qp	39.0/37.0	[277]
	SiOSi 7/8	5.32/5.46	qp	37.0/35.9	[277]
	SiOSi 9/10	5.64/5.57	qp	34.8/28.0	[277]
SiO_2 (low cristobalite)	SiOSi MAS	5.3	0.0	44	[278]
SiO_2 (α-cristobalite)	SiOSi	5.3	0.125	36.7	[279]
		5.35	0.21	37.5	[280]
SiO_2 (α-quartz)	SiOSi	5.21	0.19	43	[280]
SiO_2 (amorphous)	SiOSi	5.8	0.0	50	[281]
	SiOH	4.0	0.3	20	[281]
	SiOH	4.4	0.0	37	[282]
SiO_2 (stishovite)	OSi_3	6.5	0.125	109	[283]
SiO_2 (coesite)	SiOSi O5	5.16	0.292	58	[284]
	SiOSi O2	5.43	0.166	41	[284]
	SiOSi O3	5.45	0.168	57	[284]
	SiOSi O4	5.52	0.169	53	[284]
	SiOSi O1	6.05	0.000	29	[284]
SiO_2 (glass)	SiOSi	5.08	0.150	37.58	[285]
$2Mg_2SiO_4 \cdot Mg(OH)_2$ (hydr.-chondrodite)	OH	6.6	0.1	25	[286]
$4Mg_2SiO_4 \cdot Mg(OH)_2$ (hydr.-clinohumite)	OH	7.0	0.2	25	[286]
β-Mg_2SiO_4 (hydr. wadsleyite)	O2	4.9	0.9	76	[287]
		5.0	0.9	78	[288]
	O3	4.4	0.2	66	[287]
	O4	3.8	0.3	65	[287]
	O1	1.3	qp	38	[287]
Mg_2SiO_4 (forsterite)	SiOMg-I	2.35	0.2	61	[289]
		2.8	qp	64	[290]
	O3 3QMAS	2.5	0.2	61	[291]
	SiOMg-II	2.35	1.0	62	[289]
		3.3	qp	72	[290]
	O2 3QMAS	2.5	0.4	64	[291]
	SiOMg-III	2.70	0.3	47	[289]
		3.0	qp	49	[290]
	O1 3QMAS	2.9	0.3	48	[291]
$Mg_3Si_4O_{10}(OH)_2$ (talc)	SiOMg	3.2	0.0	40	[281]
	SiOSi	5.8	0.0	50	[281]
	MgOH	7.3	0.0	0	[281]
$2Mg_2SiO_4 \cdot Mg(OH)_2$ (chondrodite)	O1/O2	2.5/2.3	0.3/0.2	63/60	[286]
	O3/ O4	2.3/2.7	0.3/0.2	59/52	[286]
$4Mg_2SiO_4 \cdot Mg(OH)_2$ (clinohumite)	O2/ O6	2.5/2.4	0.3/0.2	65/64	[286]
	O3+O4	2.3	0.1	61	[286]
	O7/ O8	2.4/2.4	0.2/0.2	60/59	[286]
	O5/O1	2.7/2.7	0.2/0.2	52/49	[286]

$MgSiO_3$ (ortoenstatite)	O21/ O22	2.8/2.9	qp/ qp	42/46	[292]
	O11/O12	3.0/3.0	qp/ qp	52/54	[292]
	O31/ O32	4.3/4.9	qp/ qp	64/73	[292]
$MgSiO_3$ (protoenstatite)	O1+impurity	2.8	qp	52	[292]
	O2/ O3	2.7/4.3	qp/ qp	39/66	[292]
$MgSiO_3$ (clinoenstatite)	O21/ O22	2.8/2.8	qp/ qp	45/41	[292]
	O11/ O12	3.0/3.0	qp/ qp	51/54	[292]
	O31/ O32	4.3/4.8	qp/ qp	64/75	[292]
	6 sites	2.9–5.2	qp	57-70	[290]
	SiOMg-I	3.2	0.0	60	[293]
	SiOMg-II	3.2	0.0	42	[293]
	SiOSi	5.1	0.3	62	[293]
$Mg_3Si_4O_{10}(OH)_2$ (talc)	SiOMg	3.2	0.0	40	[281]
	SiOSi	5.8	0.0	50	[281]
	MgOH	7.3	0.0	0	[281]
$CaMgSi_2O_6$ (diopside)	SiOCa	2.7	0.0	84	[293]
	SiOCa	2.83	0.13	86	[290]
	O1 81.4 MHz	2.7	qp	85	[292]
	SiOMg	2.7	0.1	63	[293]
	SiOMg	2.74	0.00	64	[290]
	O2 81.4 MHz	2.9	qp	63	[292]
	SiOSi	4.4	0.3	69	[293]
	SiOSi	4.39	0.36	69	[290]
	O3 81.4 MHz	4.3	qp	70	[292]
α-$CaSiO_3$ (pseudowollastonite)	br O	3.8	0.2	75	[293]
	2 nb O	2.3/2.1	0.1/0.1	91/94	[293]
$CaSiO_3$ (wollastonite)	9 sites	2.0-4.8	qp	67-115	[290]
Ca_2SiO_4 (larnite)	4 sites	2.5-2.9	qp	122-134	[290]
$38.5CaO{\cdot}61.5SiO_2$ (glass CS46)	nb O	2.1	qp	104.7	[294]
	SiOSi	4.3	qp	62.7	[294]
$Li_2Si_2O_5$	br O1	5.6	0.55	108	[295]
	br O2	4.05	0.05	35	[295]
	nb O3	2.45	0.1	38	[295]
$Li_2Si_2O_5$ (glass)	br O	5.0	0.15	68	[295]
	nb O	2.55	0.2	42	[295]
Na_2SiO_3	br O2	4.20	0.58	63	[170]
	nb O1	2.43	0.17	39	[170]
α-$Na_2Si_2O_5$	br O1/ br O2	5.74/4.67	0.2/0.3	52/74	[295]
	br O1/ br O2	5.7/4.7	0.0/0.25	55/55	[283]
	nb O3	2.4	0.2	36	[295]
		2.35	0.1	34	[283]
ϵ-$Na_2Si_2O_5$	nb O	-	-	45	[283]
$Na_2Si_2O_5$ (glass)	br O	4.9	0.1	69	[295]
	nb O	2.35	0.2	37	[295]
$Na_2Si_4O_9$ (glass)	SiOSi	5.2	0.22	51	[296]
	nb O	2.7	0.25	40	[296]
	H_2O	6.0	0.7	20	[296]
$Na_2Si_3O_7$ (glass)	br O/ nb O	5.0/2.3	0/0	60/39	[283]
$24Na_2O{\cdot}76SiO_2$ (glass)	SiOSi	4.73	0.5	48.3	[297]
	SiONa	2.03	0.6	32.2	[297]
$Na_8Si_{32}O_{64}(OH){\cdot}32H_2O$	SiOSi	5.1	0	42.6	[298]
(sodium ilerite, RUB-18)	SiOH	3.1	0	61.2	[298]
$Na_4Zr_2Si_3O_{12}$	SiOZr 1	2.68	0.0	169.5	[232]

	SiOZr 2	2.75	0.1	118.0	[232]
	SiOZr 3	2.80	0.2	126.0	[232]
$ZrSiO_4$	SiOZr	-	-	160	[232]
$K_2Si_2O_5$	br O1/O2	5.1/4.7	0.1/0.2	114/69	[295]
	nb O3	2.1	0.5	72	[295]
$K_2Si_2O_5$ (glass)	br O	4.7	0.25	60	[295]
	nb O	2.5	0.45	84	[295]
$K_2Si_4O_9$ (wadeite)	br O1	4.45	0.35	62.5	[283]
	SiOSi O2	4.90	0.2	97	[283]
$KHSi_2O_5$	br O	4.9	0.1	51	[299]
	nb O	3.5	0.35	60	[299]
$K_2Si_4O_9$ (glass)	br O	4.9	0	52	[283]
	nb O	2.3	0	76	[283]
$Rb_2Si_2O_5$	br O1	4.4	0.1	124	[295]
	br O2	4.7	0.5	59	[295]
	nb O3	1.9	0.5	93	[295]
$Cs_2Si_2O_5$ (glass)	br O	4.55	0.3	68	[295]
	nb O	3.1	0.55	145	[295]
$BaSiO_3$	br O	3.7	0.4	87	[293]
	nb O	1.6	0.1	159	[293]
	nb O	2.1	0.1	169	[293]
$Ba_2TiSi_2O_8$ (fresnoite)	SiOTi	-	-	190 (anisotr.)	[300]
	SiOSi	3		0 (anisotr.)	[300]
$LiTiOSiO_4$	TiOSi	3.05	0.35	157	[301]
	nb apical OTi	≈0	-	741	[301]
α-$SrSiO_3$	br O	4.1	0.4	80	[293]
	nb O	2.2	0.1	105	[293]
	nb O	2.1	0.1	108	[293]
$La_{9.33}(SiO_4)_6O_2$ (apatite-type)	O1 or O2	0.266	0.6	165	[302]
	O2 or O1	0.305	0.6	214	[302]
	O3	0.264	0.6	194	[302]
	O4	-	-	600	[302]
Soda-lime borosilicate glass	SiOSi	4.91	0.34	48.1	[297]
	SiOB	5.24	0.45	61.9	[297]
	BOB	5.07	0.46	84.3	[297]
	SiONa	2.60	1	35.2	[297]
	SiO(Ca, Na)	4.91	0.89	70.5	[297]
Cesium borosilicate glass,	br O slice 1	qp=4.2	0.6	52.9	[303]
CBS-2-1.5	br O slice 2	qp=4.5	0.3	60.1	[303]
	br O slice 3	qp=4.5	0.3	67.8	[303]
	br O slice 4	qp=4.5	0.6	77.5	[303]
	nb O site 2	qp=2.3	-	123.7	[303]
Cesium borosilicate glass,	SiOSi	qp=5.1	0.4	44.7	[303]
CBS-2-1.5	SiOB	qp=5.6	0.8	67.6	[303]
	BOB	qp=5.4	0.7	98.5	[303]
Sodium borosilicate glass,					
NBS-K0.5R0.25	SiOSi	5.13	qp	42.3	[304]
NBS-K2R0.5	SiOSi	5.08	qp	43.9	[304]
NBS-K4.5R0.75	SiOSi	5.08	qp	44.2	[304]
Barium borosilicate glass	nb BaOSi	2.3	qp	158	[305]
40BaO $30B_2O_3$ $30SiO_2$	nb BaOB	3.6	qp	197	[305]
Ba Si glass	br O	4.0	0.3	78	[306]
Ba Ca Si glass	br O	4.1	0.3	68	[306]

Ca Si glass	br O	4.7	0.3	59	[306]
	br O	4.6	0.0	66	[282]
	nb O	2.1	0.2	110	[282]
$CaTiSiO_5$ (crystalline titanite)	Ti-O-Ti	0.2	≈1	632	[307]
	Si-O-Ti	2.7−3.2	0.1−0.2	166−189	[307]
$PbO\text{-}SiO_2$ glasses	Si-O-Si	4.4-4.1	$0.5_{assumed}$	74.6-80.2	[308]
$0.60 \leq X_{PbO} \leq 0.71$	Pb-O-Si	2.9	$0.5_{assumed}$	150.7-151.7	[308]
	Pb-O-Pb	3.1-3.0	$0.5_{assumed}$	287.5-282.6	[308]
Zeolites and zeolite-like materials					
Na-A, dehydrated	SiOAl	3.2	0.2	32 MAS	[278]
	SiOAl O1	3.5	qp	43.6 5QMAS	[309]
	SiOAl O2	3.6	qp	31.2 5QMAS	[309]
	SiOAl O3	3.4	qp	40.8 5QMAS	[309]
Na-A, hydrated	SiOAl O1	3.4	0	43.6	[310]
	SiOAl O2	3.4	0	31.0	[310]
	SiOAl O3	3.4	0.25	40.5	[310]
	SiOAl O1	3.4	qp	40.9	[311]
	SiOAl O2	3.6	qp	31.7	[311]
	SiOAl O3	3.4	qp	42.4	[311]
	SiOAl O1	3.5	qp	44 5QMAS	[312]
	SiOAl O2	3.6	qp	31 5QMAS	[312]
	SiOAl O3	3.4	qp	41 5QMAS	[312]
	SiOAl O1	3.5	qp	43.8 5QMAS	[309]
	SiOAl O2	3.6	qp	31.0 5QMAS	[309]
	SiOAl O3	3.4	qp	41.4 5QMAS	[309]
K-A, dehydrated	SiOAl O1	3.7	qp	31.6 5QMAS	[309]
	SiOAl O2	3.7	qp	36.3 5QMAS	[309]
	SiOAl O3	3.5	qp	47.2 5QMAS	[309]
K-A, hydrated	SiOAl O1	3.5	qp	50.9 5QMAS	[309]
	SiOAl O2	3.9	qp	33.9 5QMAS	[309]
	SiOAl O3	3.7	qp	54.8 5QMAS	[309]
Sr-A, hydrated	SiOAl O1	3.7	qp	60.2 5QMAS	[309]
	SiOAl O2	3.9	qp	38.0 5QMAS	[309]
	SiOAl O3	3.6	qp	48.7 5QMAS	[309]
Tl-A, hydrated	SiOAl O1	3.3	qp	60.7	[311]
	SiOAl O2	3.6	qp	53.4	[311]
	SiOAl O3	3.2	qp	75.5	[311]
Na,K-LSX, hydrated	SiOAl O1	3.3	qp	50.6	[311]
	SiOAl O2	3.3	qp	42.1	[311]
	SiOAl O3	3.4	qp	45.2	[311]
	SiOAl O4	3.6	qp	36.8	[311]
Na-LSX, hydrated	SiOSi	5.0	qp	53 3QMAS	[312]
	SiOAl O1	3.2	0.4	50.3	[310]
	SiOAl O1	3.5	qp	49 5QMAS	[312]
	SiOAl O2	3.3	0.3	41.7	[310]
	SiOAl O2	3.3	qp	37 5QMAS	[312]
	SiOAl O3	3.4	0.3	45.0	[310]
	SiOAl O3	3.4	qp	42 5QMAS	[312]
	SiOAl O4	3.6	0.15	36.9	[310]
Na,K-LSX, dehydrated	SiOAl O1	3.2	qp	42.5	[313]
	SiOAl O2	3.3	qp	37.9	[313]
	SiOAl O3	3.3	qp	38.7	[313]

	SiOAl O4	3.3	qp	33.1	[313]
	SiOAl O1/O2//O3/O4	43.3/36.1/33.3/25.4			[314]
Rb,K-LSX, dehydrated	SiOAl O1/O2//O3/O4	56.4/47.8/44.7/35.8			[314]
Ga-X	SiOGa	4.0	0.3	28	[315]
	SiOSi	5.0	0.0	50	[315]
	SiOSi	4.6	0.1	44 MAS	[278]
Ba, Na-Y, Si/A=2.74, dehydr.	SiOAl	3.4	0.4	40 MAS	[278]
	SiOSi	5.1	0.15	52 MAS	[278]
Na-Y, dealuminated, dehydr.	SiOSi	5.2	0.2	45 MAS	[278]
Na-Y, Si/A=2.74, dehydrated	SiOAl	3.1	0.2	31 MAS	[278]
NH_4-Y, Si/A=2.92, dehydr.	SiOAl	3.2	0.2	31 MAS	[278]
	SiOSi	5.0	0.1	48 MAS	[278]
H-Y, dehydrated	OH δ_{1H}=3.7 ppm	6.0	1.0	21	[316]
	OH δ_{1H}=4.4 ppm	6.2	0.9	24	[316]
	SiO2,3,4-Al	3.7	0.2	27.5	[317]
	SiO1Al	3.5	0.3	33.3	[317]
	SiO2,3,4Si	5.3	0.1	44.0	[317]
	SiO1Si	5.1	0.3	50.0	[317]
Na-ZSM-5, hydrated	SiOSi	5.3	0.12	40.0	[318]
	SiOAl	3.5	0.29	30.0	[318]
H-ZSM-5, dehydrated	OH δ_{1H}=4.2 ppm	7.0	0.75	31	[316]
	OH δ_{1H}=4.2 ppm	6.8	0.5	35	[316]
	OH δ_{1H}=4.2 ppm	5.8	0.6	37	[316]
H-ZSM-5, dehydrated	SiOH	-	-	≈5	[319]
	SiOAl	-	-	≈30	[319]
	Si0Si	-	-	≈50	[319]
H-ZSM-5 (dehydrated)	various	3.9—6.5	0.37—0.84	2.8—4.1	[68]
$Na_6[AlSiO_4]_6 \cdot 8H_2O$ (hydrosodalite)	SiOAl	3.4	qp	39.1	[313]
$Na_6[AlSiO_4]_6$ (dehydr. hydrosodalite)	SiOAl	4.3	qp	36.3	[313]
$Na_8[AlSiO_4]_6(OH)_2 \cdot 2H_2O$ (hydroxosodalite)		3.4	qp	36.0	[313]
$Na_8[AlSiO_4]_6(OH)_2$ (dehydr. hydroxosodalite)		3.5	qp	39.2	[313]
Ga-sodalite	SiOGa	4.0	0.3	29	[315]
	SiOSi	5.1	0.0	52	[315]
Na-Ba-Ga-sodalite	SiOGa	4.0	0.3	29	[315]
	SiOSi	5.1	0.0	52	[315]
$AlPO_4$-5	AlOP	5.7	0.0	63	[315]
$AlPO_4$-11	AlOP	5.7	0.0	64	[315]
$AlPO_4$-17	AlOP	5.6	0.1	67	[315]
$AlPO_4$-14 as synth., 6 signals	AlOP	4.93—5.85	0.10—0.41	66.8—97.4	[320]
$AlPO_4$-14 calcined, dehydrated	AlOP	5.86	0.16	59.0	[320]
	AlOP	5.76	0.21	68.8	[320]
$AlPO_4$-SIZ-4 (CHA) (EMIMCl)	AlOP O1−012 (MQMAS)			82−69	[321]
	(DOR)	5.6−5.9	qp	51−78	[321]
$AlPO_4$-SIZ-4 (CHA) (calcined)	AlOP O1	6.38	qp	43.2	[321]
	AlOP O2	6.46	qp	31.8	[321]
	AlOP O3	6.46	qp	33.1	[321]
	AlOP O4	6.33	qp	45.5	[321]
SAPO-34	Al-O-Si	3.5/3.6	0.15/0.10	32/36	[322]
	Al-O-P	6.3/6.1	0.45/0.45	67/74	[322]
Ge-UTL (ADOR parent)	Si-O-Si	5.3	qp	39.3	[323]
ICP-2P (ADOR daughter)	Si-OH			20	[324]
	Si-O-Si			20—40	[324]

MOFs (metal-organic frameworks)

Al MIL-53 (calcined)	Carboxylate	7.1	0.8	230	[325]
	Hydroxyl	5.5	0.7	20	[325]
Al MIL-53 (calcined, hydrated)	Carboxylate1	7.1	0.7	255	[325]
	Carboxylate2	7.9	0.7	225	[325]
	Hydroxyl	7.2	0.9	15	[325]
MIL-53(Al)-*np*	O1 (μ_2-OH)	6.37	0.5	25.6	[326]
	O2 (-COO^-)	7.77	0.75	228.0	[326]
	O3 (-COO^-)	7.36	0.55	235.0	[326]
	O4 (-COO^-)	6.95	0.63	258.0	[326]
	O5 (-COO^-)	7.57	0.64	264.6	[326]
GaMIL-53 (calcined)	Carboxylate	7.7	qp	230	[325]
	Hydroxyl	4.6	qp	31	[325]
GaMIL-53 (calcined, hydrated)	Carboxylate1	7.5	qp	259	[325]
	Carboxylate2	8.1	qp	230	[325]
	Hydroxyl	5.9	qp	24	[325]
MIL-53 (hydrothermal synthes.)	Al-OH-Al	5.4	0.7	23	[327]
	Al-OH-Ga	4.5	1.0	25	[327]
	Ga-OH-Ga	3.9	1.0	31	[327]
Al-MIL-53 + $Ga_2(SO_4)_3$	Al-OH-Al	5.7	0.6	19	[328]
	Al-OH-Ga	4.4	0.9	30	[328]
	Ga-OH-Ga	4.1	0.8	39	[328]
Ga-MIL-53 + $Al_2(SO_4)_3$	Al-OH-Al	5.4	0.7	16	[328]
	Al-OH-Ga	4.5	1.0	22	[328]
	Ga-OH-Ga	3.9	1.0	33	[328]
$\alpha Mg_3(HCOO)_6$ as-made/activated	O1−012	6.0−7.9	0.2−0.88	227−308	[329]

Other (non-zeolite) aluminosilicates

$Na_{0.46}Ca_{2.0}Al_{4.5}Si_{13.5}O_{36} \cdot 10.8H_2O$	SiOSi	5.1	0.18	43	[330]
(stilbite)	SiOAl	3.5	0.28	33	[330]
$NaAlSi_2O_6 \cdot H_2O$ (analcime)	SiOSi	5.0	qp	51	[331]
	SiOSi	4.7	qp	51 5Q MAS	[312]
	SiOAl	3.1	qp	35	[331]
	SiOAl	3.2	qp	35 5QMAS	[312]
	AlOAl	1.7	qp	26	[331]
	H_2O	6.87	0.67	−15.5	[332]
	H_2O	7.6	0	(−?)18	[333]
$Al_2Si_2O_5(OH)_4$ (kaolinite)	SiOSi O3/O4	4.45/4.75	0.43/0.28	54.3/46.5	[334]
	SiOSi O5	4.65	0.38	51.3	[334]
	OH	6.9	0.55	41.5	[334]
	SiO2Al	3.4	0.8	6	[334]
$KAl_2[(OH,F)_2/AlSi_3O_{10}]$	SiOSi	4.6	0.5	53.0	[334]
(muscovite)	SiOSi	4.5	qp	53.2	[335]
	SiO2Al	3.5	0.8	66.5	[334]
	SiO2Al	3.5	qp	66.2	[335]
	SiOAl	3.1	0.5	46.2	[334]
	SiOAl	2.89	qp	45.22	[335]
	OH	6.75	0.5	44.5	[334]
	2AlOH	7.4	qp	34	[335]
$NaAlSi_2O_6$ (jadeite)	O1	3.3	0.9	64	[110]
	O2	4.1	0.15	59	[110]
	O3	5.0	0.5	69	[110]
$Mg_3Al_2Si_3O_{12}$ (pyrope)		3.40	0.30	84.0	[110]

$Ca_3Al_2Si_3O_{12}$ (grossular)		4.10	0.40	102.0	[110]
$1.7Al_2O_3{\cdot}SiO_2$ (mullite)	Oc*	2.0	0.4	40.5	[110]
	Oc	3.3	0.1	76	[110]
	Oab and Od	3.3	0.3	58.5	[110]
Yttrium aluminosilicat glass	br O	3.1	-	54	[336]
	nb O			143	[336]
	nb O			210	[336]
Lanthanum aluminosilicat glass	br O	3.1	-	58	[336]
	nb O			178	[336]
$NaAlSi_3O_8$ (glass)	SiOSi	5.1	0.15	49	[337]
	SiOSi	5.2	0.2	40	[296]
	SiOAl	3.2	0.05	33	[337]
	SiOAl	3.8	0.2	25	[296]
Na, $LiAlSiO_4$ (glasses)	SiOSi	≈4.5-5.0	-	≈49-66	[338]
	SiOAl	≈3.0-3.5	-	≈35-42	[338]
	AlOAl	≈1.7-1.9	-	≈18-22	[338]
$14Na_2O{\cdot}4Al_2O_3{\cdot}17B_2O_3{\cdot}65SiO_2$	SiOSi	5.1	qp	40	[339]
(glass)	SiOB	5.2	qp	57	[339]
	BOB	5.6	qp	62	[339]
	SiOAl	3.6	qp	26	[339]
$CaAl_2Si_2O_8$ (glass)	SiOAl	3.5	-	61	[340]
	nb O	2.9	-	113	[340]
Sodium aluminosilicate glass, NAS, Si/Al=0.7	AlOAl	1.85	qp	19	[273]
Calcium aluminosilicate glass, CAS, Si/Al=0.5	AlOAl	2.4	qp	68	[273]
La, Lu, Sc, Y in aluminosilicate glasses		1.82-3.30	-	140-202	[341]
Other (non-zeolite) phosphorous containing materials					
h-P_2O_5	br POP	7.46	0.60	122	[342]
	nb PO	3.96	0.00	80	[342]
KH_2PO_4		5.2	0.55	92	[343]
$NH_4H_2PO_4$		5.1	0.55	93	[343]
α/β-$Mg_2P_2O_7$	nb O	5.27	0.40	82.9	[344]
$Na_4P_2O_7$	2 nb O	3.90/3.90	0.6/0.6	85.7/81.0	[344]
	br O	3.90	0.55	134.3	[344]
$Ba_2P_2O_7$	nb O	4.19	0.26	141.3	[344]
	2 br O	7.25/6.82	0.15/ qp	142.9/134.9	[344]
Sodium phosphate glass	br POP	7.7	0.35	119.1	[345]
$51.7Na_2O$ $48.3P_2O_5$	nb PONa	4.8	0.15	84.1	[345]
NaPON glass	PONa	4.4	0.2	8.0	[346]
	PON-1/2/3/4	4.3-4.4	0.1-0.3	12.2-15.8	[346]
Sodium borophosphate glass	nb NaOP	4.2	qp	83	[347]
	br POP	7.9	qp	120	[347]
	nb NaOB	4.7	qp	61	[347]
	br BOP	7.1	qp	93	[347]
$Ca_5(PO_4)_3(OH)$ (hydroxyapatite)	peak 1/2	4.0/4.1	0.0/0.1	108/115	[343]
$CaHPO_4{\cdot}2H_2O$	peak 1/2	4.2/4.3	0/0	98/96	[343]
$CsH(PO_3H)$	O1/O4	3.8	0.0	155	[348]
	O2/O5	4.4	0.1	129	[348]
	O3/O6	5.9	0.5	100	[348]

Other (non-zeolite) germanium containing materials

GeO_2 (quartz)	GeO_4	7.3	0.48	70	[349, 350]
	O_{44}	7.05	0.53	49.5	[249]
GeO_2 (rutile)	OGe_3	7.5	0.10	160	[349, 350]
	O_{66}	7.35	0.08	152.2	[249]
GeO_2 (glass)	GeO_4	7.1	0.48	70	[350]
	O_{44}	7.7	qp	42	[249]
$Na_2Ge_2O_5$	nb O	5.95	0.0	38.5	[248]
	O_{44}	6.05	0.6	61	[248]
Na_2GeO_3	GeO_4	5.2	0.5	70	[349]
	O_{44} O1	5.5	0.70	75	[249]
	nb O	2.5	0.5	47	[349]
	nb O1	5.45	0.00	45.5	[249]
$Na_2Ge_4O_9$	O_{44}	5.9	0.54	70.0	[249]
	O_{46} A	5.9	0.48	117.0	[249]
	O_{46} B	5.7	0.48	133.5	[249]
	O_{46} C	6.4	0.65	151.0	[249]
$Na_4Ge_9O_{20}$	O_{44}/ O_{46}	6.4/5.6	0.65/0.88	70.0/117.0	[249]
	O_{666}	3.75	0.05	133.5	[249]
$Na_2O{\cdot}9GeO_2$ (glass)	GeO_4& GeO_6	7.0	0.5	165	[349]
2 $9GeO_2$ (glass)	GeO_4	6.0	0.5	80	[349]
$14Na_2O{\cdot}86GeO_2$ (glass)	O_{44}	7.0	qp	57	[249]
	O_{45}/O_{46}	7.1	qp	97	[249]
	O_{45}/O_{46}	6.3	qp	144	[249]
$27Na_2O{\cdot}73GeO_2$ (glass)	nb O	5.9	qp	47	[249]
	O_{44}	6.6	qp	64	[249]
	O_{45}/O_{46}	6.8	qp	105	[249]
$LiTiOGeO_4$	TiOGe	4.8	0.22	148	[301]
$HfGeO_4$ (gel)	HfOGe	5.2	0.65	185	[351]

Others

H_2O_2 (solution)		-	-	180	[352]
(NQR at 1.5 K)		16.31	0.687	-	[353]
$NaIO_4$		11.19	0.066	250	[354]
KIO_4		10.87	0.032	251	[354]
HfO_2 and hafnates	7 compounds	-	-	237.8-331.9	[351]
	nb apical OTi	≈0	-	749	[301]
$KReO_4$ (perrhenate)		1.28	0.25	137	[355]
NH_4ReO_4 (perrhenate)		1.25	0.16	133	[355]
TiO_2 (rutile)	TiOTi	1.5	0.87	596.5	[356]
	TiOTi	< 1.5	-	590	[267]
(anatase)	TiOTi	< 1.1	-	558	[267]
Ti2O3 (corundum)	TiOTi	< 2.6	-	503	[267]
$K(Mg_{2.5}Al_{0.5})[Al_{1.5}Si_{2.5}O_{10}](OH)F$ (phlogopite)					
	H-O-$^{[6]}$(Mg,Al)	5.5	0.6	78.6	[357]
	Si-O-$^{[6]}$(Mg,Al)	1.5	0.7	71.1	[357]
	Si-O-Si 1	2.8	0.3	46.9	[357]
	Si-O-$^{[4]}$Al	2.2	0.7	42.5	[357]
	Si-O-Si 2	2.7	0.3	33.8	[357]
	Al-O-Al	2.4	0.7	25.0	[357]
Li_2O_2	LiOLi	18.0	0.00	227	[358]
Li_2, Ca, Sr, $BaTiO_3$	5 compounds	-	-	372-564	[275]
Li_2, Na_2, Ca, Sr, $BaZrO_3$	5 compounds	-	-	280-376	[275]

Li_2, $SrSnO_3$	3 compounds	-	-	85-423	[275]
$LiNbO_3$		3.4 (maximum)	-	504	[275]
SiO_2/TiO_2 (gel)	SiOSi	5.1	0.0	42	[359]
QTiAc: TEOS, $Ti(OPr^i)_4$, AcacH	SiOTi	2.7	0.0	174	[359]
	SiOTi	3.0	0.0	314	[359]
	nb OTi_4/ nb OTi_3		-	375/542	[359]
ZrO_2	tetragonal	< 1.4	-	383	[267]
	tetragonal	0.26	0.68	384	[360]
(baddeleyite)	2 monoclinic	< 0.9/< 1.0	-	325/402	[267]
ZnO nanoparticle	$HOZn_3$	5.6	-	−4.5	[268]
	OZn_3	4.8	-	−6.1	[268]
	OZn_4	1.5	-	−3.3	[268]
	OZn_4	<0.5	-	from −14 to −38	[268]
ZnO (wurtzite)		< 1.4	-	383	[267]
SnO (litharge)		< 2.3	-	251	[267]
La_2O_3	hexagonal	< 1.4/2.2	-	469/590	[267]
HfO_2 (baddeleyite)		< 1.1	-	267/335	[267]
PbO (litharge)		< 0.9	-	294	[267]
M_xO_y-PDMS-hybrides	SiOTa	3.0	-	243	[361]
	nb OTa_2	-	-	440	[361]
	SiONb	-	-	275	[361]
	nb ONb_2	-	-	545	[361]
	SiOTi	3.0	-	332	[361]
	nb OTi_2	-	-	719	[361]
	SiOZr	3.4	-	219	[361]
	nb OZr_3	-	-	402	[361]
V_2O_5 (crystalline)	O_{1A}	0.9	0.6	1213	[362]
	O_{1B}	4.0	0.7	400	[362]
	O_{1C}	3.3	0.6	0	[362]
$Na_2Al_2B_2O$	O1/ O2	3.7/1.4	0.77/0	65.0/24.5	[134]
SrB_4O_7	BO	5.50/5.60/5.55	0.25-0.65	79.8/78.2/72.1	[363]
	Tricluster	6.6	0.2	68.0	[363]
Sodium aluminoborate glass	AlOAl	1.7	qp	18.6	[364]
NAB-40-20-40	AlOB	3.7	qp	44.1	[364]
	AlOB	4.1	qp	62.7	[364]
	B nb O	4.0	qp	83	[364]
	BOB	4.8/5.0	qp	8/995	[364]
NAB-30-5-65	AlOB	4.3	qp	61.9	[364]
	B nb O	4.0	qp	83	[364]
	2 BOB	4.8/5.4	qp/ qp	87.1/96	[364]
Borate, borosilicate,	SiOSi	5.4 and 4.9	qp	37 and 51	[365]
boroaluminate glasses	BOB	5.5 and 5.1	qp	92 and 82	[365]
	SiOB	5.6	qp	64	[365]
	Si[B]ONa	2.2	qp	35	[365]
	Si[B]OK	2.1	qp	76	[365]
	AlOB	4.1	qp	59	[365]
	Al[B]ONa	1.7	qp	16	[365]
Titania based hybrids	POTi 4	5.2	0.15	152.5	[366]
	POTi 1-2-3	5.3	0.15	215.0	[366]
$Mg(OH)_2$ (brucite)	MgOH	6.8	0	20	[367]
	MgOH	6.8	0.0	25	[286]
$Mg(OH)_2$	MgOH	6.8	0.0	25	[266]
$Ba(ClO_3)_2 \cdot H_2O$	H_2O	6.8	1.00	22	[343]

$Ba_2In_2O_5$ (brownmillerite)	site A (O1/O3)	5.0	0.2	189	[368]
	site B (O2)	5.8	0.2	146	[368]
$Ba_2In_2O_4(OH)_2$	site A/ site B	4.5/4.1	0.0/0.7	188/173	[369]
	site C/ site D	4.2/4.8	0.5/0.7	152/97	[369]
$LaSiO_2N$ (La-N-wollastonite)	nb OSi	2.4	-	215	[370]
$La_4Si_2O_7N_2$	ionic	≈0	-	575	[370]
	nb OSi	2.4	-	220	[370]
La_4SiAlO_8N	ionic	≈0	-	570	[370]
	nb OAl	1.8	-	311	[370]
	nb OSi	3.1	-	246	[370]
$La_{10}Si_6O_{24}N_2$	ionic	<1	-	596	[370]
$NaNO_2$		11.05	0.58	643	[371]
$Na_2(ONNO_2)$		13.5	0.40	265	[372]
$[HONH_3]Cl$		14.7	0.71	90	[372]
LiOH (NQR)		−7.283	0.07	-	[373]
NaOH (NQR at 77 K))		−7.590	0.07	-	[373]
KOH (NQR at 77 K))		−7.140	0.08	-	[373]
β-$Ba(OH)_2$ (NQR at 77 K))		−7.124	0.07	-	[373]
$Sr(OH)_2$ (NQR at 77 K))		−7.267	0.08	-	[373]
$Ca(OH)_2$		6.5	0.00	62	[343]
CaOH		6.5	0.3	71	[282]
$CaCO_3$		6.97	1	204	[374]
ThO_2		very small		576	[375]
UO_2		very small		717	[375]
NpO_2		very small		475	[375]
PuO_2		very small		54	[375]
AmO_2		very small		−754	[375]
$Y_2Sn_2O_7$	O1	≈0.02	0.14	384.0	[376]
	O2	3.2	0.36	172.5	[376]
$Y_2Ti_2O_7$	O1	≈0.02	0.13	386.1	[376]
	O2	0.7	0.50	454.6	[376]
$La_2Sn_2O_7$	O1	≈0.02	0.20	641.5	[376]
	O2	3.3	0.90	222.0	[376]
$Y_2Sn_2O_7$	O1	0.02	-	384.0	[377]
$Y_2Sn_2O_7$	O2	3.2	0.4	172.5	[377]
$Y_2Ti_2O_7$	O1	0.02	-	386.1	[377]
$Y_2Ti_2O_7$	O2	0.7	0.5	454.6	[377]
$La_2Sn_2O_7$	O1	0.02	-	641.5	[377]
$La_2Sn_2O_7$	O2	3.3	0.9	220.0	[377]
$La_2Zr_2O_7$	O1	0.02	-	626.3	[377]
$La_2Zr_2O_7$	O2	1.5	0.4	394.0	[377]
$La_2Hf_2O_7$	O1	0.02	-	629.9	[377]
$La_2Hf_2O_7$	O2	1.4	0.6	350.8	[377]
$La_2Mg_3(NO_3)_{12}\cdot 24H_2{}^{17}O$ (LMN)	H_2O-1	7.1	0.8	−5	[378]
	H_2O-2	7.1	0.8	−2	[378]
	H_2O-3	6.6	0.8	0	[378]
	H_2O-4	6.8	0.9	3	[378]
α-TeO_2		7.39	0.42	179	[379]
$La_2NiO_{4+\delta}$	8 sites	<4.6/≈4.6	-	532 and 3640-5590	[380]
$Ba(ClO_3)_2\cdot H_2O$	H_2O	6.91	0.97	19.7	[381]
$Li_2SO_4\cdot H_2O$	H_2O	6.6	0.86	−7.1	[381]
$K_2C_2O_4\cdot H_2O$	H_2O	6.62	0.95	1.1	[381]
$NaClO_4\cdot H_2O$	H_2O	7.35	0.72	−17	[381]

References

[1] J.W. Zwanziger, Computing Electric Field Gradient Tensors, in: R.E. Wasylishen, S.E. Ashbrook, S. Wimperis (Eds.), NMR of Quadrupolar Nuclei in Solid Materials, Wiley, Chichester, 2012, pp. 199-209.

[2] M.E. Smith, Recent progress in solid-state nuclear magnetic resonance of half-integer spin low-γ quadrupolar nuclei applied to inorganic materials, Magn. Reson. Chem. 59 (2021) 864-907. https://doi.org/10.1002/mrc.5116.

[3] R.K. Harris, E.D. Becker, S.M.C. De Menezes, R. Goodfellow, P. Granger, NMR Nomenclature. Nuclear Spin Properties and Conventions for Chemical Shifts - (IUPAC Recommendations 2001), Pure Appl. Chem. 73 (2001) 1795-1818. https://doi.org/10.1351/pac200173111795.

[4] D. Müller, personal communication, 1992.

[5] C.V. Chandran, C.E.A. Kirschhock, S. Radhakrishnan, F. Taulelle, J.A. Martens, E. Breynaert, Alumina: discriminative analysis using 3D correlation of solid-state NMR parameters, Chem. Soc. Rev. 48 (2019) 134-156. https://doi.org/10.1039/c8cs00321a.

[6] M. Edén, Update on ^{27}Al NMR studies of aluminosilicate glasses, Annu. Rep. NMR Spectrosc. 101 (2020) 285-410. https://doi.org/10.1016/bs.arnmr.2020.07.002.

[7] S.E. Ashbrook, K.J.D. MacKenzie, S. Wimperis, Al-27 Multiple-quantum MAS NMR of Mechanically Treated Bayerite (α-$Al(OH)_3$) and Silica Mixtures, Solid State Nucl. Magn. Reson. 20 (2001) 87-99. https://doi.org/10.1006/snmr.2001.0032.

[8] K. Damodaran, P.R. Rajamohanan, D. Chakrabarty, U.S. Racherla, V. Manohar, C. Fernandez, J.P. Amoureux, S. Ganapathy, Triple-Quantum Magic Angle Spinning ^{27}Al NMR of Aluminum Hydroxides, J. Am. Chem. Soc. 124 (2002) 3200-3201. https://doi.org/10.1021/ja011532y.

[9] S.E. Ashbrook, J. McManus, K.J.D. MacKenzie, S. Wimperis, Multiple-quantum and Cross-polarized ^{27}Al MAS NMR of Mechanically Treated Mixtures of Kaolinite and Gibbsite, J. Phys. Chem. B. 104 (2000) 6408-6416. https://doi.org/10.1021/jp000316t.

[10] A. Vyalikh, K. Zesewitz, U. Scheler, Hydrogen Bonds and Local Symmetry in the Crystal Structure of Gibbsite, Magn. Reson. Chem. 48 (2010) 877-881. https://doi.org/10.1002/mrc.2682.

[11] X.Y. Xue, M. Kanzaki, H. Fukui, Unique Crystal Chemistry of Two Polymorphs of Topaz-OH: A Multi-nuclear NMR and Raman Study, Amer. Mineral. 95 (2010) 1276-1293. https://doi.org/10.2138/am.2010.3471.

[12] K.J.D. MacKenzie, J. Temuujin, M.E. Smith, P. Angerer, Y. Kameshima, Effect of Mechanochemical Activation on the Thermal Reactions of Boehmite (γ-AlOOH) and γ-Al_2O_3, Thermochim. Acta 359 (2000) 87-94. https://doi.org/10.1016/s0040-6031(00)00513-x.

[13] T. Vosegaard, H.J. Jakobsen, ^{27}Al Chemical Shielding Anisotropy, J. Magn. Reson. 128 (1997) 135-137. https://doi.org/10.1006/jmre.1997.1236.

[14] P. Florian, M. Gervais, A. Douy, D. Massiot, J.P. Coutures, A Multi-nuclear Multiple-field Nuclear Magnetic Resonance Study of the Y_2O_3-Al_2O_3 Phase Diagram, J. Phys. Chem. B 105 (2001) 379-391. https://doi.org/10.1021/jp0008851.

[15] L.A. O'Dell, S.L.P. Savin, A.V. Chadwick, M.E. Smith, A ^{27}Al MAS NMR Study of a Sol–Gel Produced Alumina: Identification of the NMR Parameters of the ϑ-Al_2O_3 Transition Alumina Phase, Solid State

Nucl. Magn. Reson. 31 (2007) 169-173.
https://doi.org/http://dx.doi.org/10.1016/j.ssnmr.2007.05.002.

[16] V. Sabarinathan, S. Ramasamy, S. Ganapathy, Perturbations to ^{27}Al Electric Field Gradients in Nanocrystalline α-Al_2O_3 Studied by High-Resolution Solid-State NMR, J. Phys. Chem. B 114 (2010) 1775-1781. https://doi.org/10.1021/jp907469n.

[17] K.N. Mikhalev, A.Y. Germov, A.E. Ermakov, M.A. Uimin, A.L. Buzlukov, O.M. Samatov, Crystal Structure and Magnetic Properties of Al_2O_3 Nanoparticles by ^{27}Al NMR Data, Phys. Solid State 59 (2017) 514-519. https://doi.org/10.1134/s1063783417030246.

[18] J. Jiao, J. Kanellopoulos, W. Wang, S.S. Ray, H. Foerster, D. Freude, M. Hunger, Characterization of Framework and Extra-framework Aluminum Species in Non-hydrated Zeolites Y by ^{27}Al Spin-echo, High-speed MAS, and MQMAS NMR Spectroscopy at B_0=9.4 to 17.6 T, Phys. Chem. Chem. Phys. 7 (2005) 3221-3226. https://doi.org/10.1039/b508358c.

[19] S.C. Xu, N.R. Jaegers, W.D. Hu, J.H. Kwak, X.H. Bao, J.M. Sun, Y. Wang, J.Z. Hu, High-Field One-Dimensional and Two-Dimensional ^{27}Al Magic-Angle Spinning Nuclear Magnetic Resonance Study of θ-, δ-, and γ-Al_2O_3 Dominated Aluminum Oxides: Toward Understanding the Al Sites in γ-Al_2O_3, ACS Omega 6 (2021) 4090-4099. https://doi.org/10.1021/acsomega.0c06163.

[20] D. Coster, A.L. Blumenfeld, J.J. Fripiat, Lewis Acid Sites and Surface Aluminum in Aluminas and Zeolites: A High-Resolution NMR Study, J. Phys. Chem. 98 (1994) 6201-6211. https://doi.org/10.1021/j100075a024.

[21] Z.J. Berkson, S. Björgvinsdottir, A. Yakimov, D. Gioffrè, M.D. Korzynski, A.B. Barnes, C. Copéret, Solid-State NMR Spectra of Protons and Quadrupolar Nuclei at 28.2 T: Resolving Signatures of Surface Sites with Fast Magic Angle Spinning, JACS Au 2 (2022) 2460-2465. https://doi.org/10.1021/jacsau.2c00510.

[22] R.H. Meinhold, R.C.T. Slade, R.H. Newman, High-Field MAS NMR, with Simulations of the Effects of Disorder on Lineshape, Applied toThermal Transformations of Alumina Hydrates, Appl. Magn. Reson. 4 (1993) 121-140. https://doi.org/10.1007/BF03162559.

[23] B. Ollivier, R. Retoux, P. Lacorre, D. Massiot, G. Ferey, Crystal Structure of κ-alumina - An X-ray Powder Diffraction, TEM and NMR Study, J. Mater. Chem. 7 (1997) 1049-1056. https://doi.org/10.1039/A700054E.

[24] G. Kunath-Fandrei, T.J. Bastow, J.S. Hall, C. Jäger, M.E. Smith, Quantification of Auminum Coordinations in Amorphous Aluminas by Combined Central and Satellite Transition Magic Angle Spinning NMR Spectroscopy, J. Phys. Chem. 99 (1995) 15138-15141. https://doi.org/10.1021/j100041a033.

[25] C. Pecharroman, I. Sobrados, J.E. Iglesias, T. Gonzalez-Carreno, J. Sanz, Thermal Evolution of Transitional Aluminas Followed by NMR and IR Spectroscopies, J. Phys. Chem. B 103 (1999) 6160-6170. https://doi.org/10.1021/jp983316q.

[26] D. Müller, W. Gessner, A. Samoson, E. Lippmaa, G. Scheler, Solid-state ^{27}Al NMR Studies on Polycrystalline Aluminates of the System CaO-Al_2O_3, Polyhedron 5 (1986) 779. https://doi.org/10.1016/S0277-5387(00)84437-X.

[27] W.S. Veeman, Quadrupole Nutation NMR in Solids, Z. Naturforsch. A 47 (1992) 353-360. https://doi.org/10.1515/zna-1992-1-260.

[28] D. Müller, W. Gessner, A. Samoson, E. Lippmaa, G. Scheler, Solid-state ^{27}Al NMR Chemical Shift and Quadrupole Coupling Data for Condensed AlO_4 Tetrahedra, J. Chem. Soc. Dalton Trans (1986) 1277-1281. https://doi.org/10.1039/DT9860001277.

[29] J. Skibsted, H. Bildsoe, H.J. Jakobsen, High-speed Spinning Versus High Magnetic Field in MAS NMR of Quadrupolar Nuclei. ^{27}Al MAS NMR of 3Ca Al_2O_3, J. Magn. Reson. 92 (1991) 669-676. https://doi.org/10.1016/0022-2364(91)90367-3.

[30] J. Skibsted, E. Henderson, H.J. Jakobsen, Characterization of Calcium Aluminate Phases in Cements by 27Al MAS NMR Spectroscopy, Inorg. Chem. 32 (1993) 1013-1027. https://doi.org/10.1021/ic00058a043.

[31] C. Gervais, K.J.D. MacKenzie, M.E. Smith, Multiple Magnetic Field ^{27}Al Solid-state NMR Study of the Calcium Aluminates $CaAl_4O_7$ and $CaAl_{12}O_{19}$, Magn. Reson. Chem. 39 (2001) 23-28. https://doi.org/10.1002/1097-458x(200101)39:1.

[32] L.S. Du, J.F. Stebbins, Calcium and Strontium Hexaluminates: NMR Evidence that "Pentacoordinate" Cation Sites Are Four-coordinated, J. Phys. Chem. B 108 (2004) 3681-3685. https://doi.org/10.1021/jp037615d.

[33] K. Harindranath, K.A. Viswanath, C.V. Chandran, T. Bräuniger, P.K. Madhu, T.G. Ajithkumar, P.A. Joy, Evidence for the Co-existence of Distorted Tetrahedral and Trigonal Bipyramidal Aluminium Sites in $SrAl_{12}O_{19}$ from ^{27}Al NMR studies, Solid State Comm. 150 (2010) 262-266. https://doi.org/10.1016/j.ssc.2009.11.008.

[34] C. Ferrara, C. Tealdi, P. Mustarelli, M. Hoelzel, A.J. Pell, G. Pintacuda, Melilite $LaSrGa_{3-x}Al_xO_7$ Series: A Combined Solid-State NMR and Neutron Diffraction Study, J. Phys. Chem. C 118 (2014) 15036-15043. https://doi.org/10.1021/jp504829x.

[35] D. Müller, W. Gessner, G. Scheler, Chemical Shift and Quadrupole Coupling of the ^{27}Al NMR Spectra of $LiAlO_2$ Polymorphs, Polyhedron 2 (1983) 1195-1198. https://doi.org/10.1016/S0277-5387(00)84356-9.

[36] J. Skibsted, N.C. Nielsen, H. Bildsöe, H.J. Jacobsen, Satellite Transitions in MAS NMR Spectra of Quadrupolar Nuclei, J. Magn. Reson. 95 (1991) 88-117. https://doi.org/10.1016/0022-2364(91)90327-P.

[37] T. Bräuniger, B. Groh, I.L. Moudrakovski, S. Indris, Local Electronic Structure in γ-LiAlO2 Studied by Single-Crystal ^{27}Al NMR and DFT Calculations, J. Phys. Chem. A 120 (2016) 7839-7846. https://doi.org/10.1021/acs.jpca.6b07286.

[38] K.J.D. MacKenzie, M.E. Smith, M. Schmucker, H. Schneider, P. Angerer, Z. Gan, T. Anupold, A. Reinhold, A. Samoson, Structural Aspects of Mullite-type $NaAl_9O_{14}$ Studied by Al-27 and Na-23 Solid-state MAS and DOR NMR Techniques, Phys. Chem. Chem. Phys. 3 (2001) 2137-2142. https://doi.org/10.1039/b101513n.

[39] R.W. Schurko, R.E. Wasylishen, A.D. Phillips, A Definitive Example of ^{27}Al Chemical Shielding Anisotropy, J. Magn. Reson. 133 (1998) 388-394. https://doi.org/10.1006/jmre.1998.1460.

[40] D. Massiot, A. Kahn-Harari, D. Michel, D. Müller, F. Taulelle, ^{27}Al MAS NMR of $Al_2Ge_2O_7$ and $LaAlGe_2O_7$: Two Pentacoordinated Aluminium Environments, Magn. Reson. Chem. 28 (1990) 82-88. https://doi.org/10.1002/mrc.1260281314.

[41] G. Kunath-Fandrei, T.J. Bastow, C. Jäger, M.E. Smith, Quadrupole and Chemical Shift Interactions of ^{27}Al in Aluminium Molybdate from Satellite Transition Magic-angle Spinning NMR, Chem. Phys. Lett. 234 (1995) 431-436. https://doi.org/10.1016/0009-2614(95)00029-4.

[42] H. Maekawa, S. Kato, K. Kawamura, T. Yokokawa, Cation Mixing in Natural $MgAl_2O_4$ Spinel: A High-temperature ^{27}Al NMR Study, Am. Mineral. 82 (1997) 1125-1132. https://doi.org/10.2138/am-1997-11-1210.

[43] M.T. Weller, M.E. Brenchley, D.C. Apperley, N.A. Davies, Correlations between ^{27}Al MAS NMR Spectra and the Coordination Geometry of Framework Aluminates, Solid State Nucl. Magn. Reson. 3 (1994) 103-106. https://doi.org/10.1016/0926-2040(94)90028-0.

[44] S.R. Jansen, H.T. Hintzen, R. Metselaar, J.W. de Haan, L.J.M. van de Ven, A.P.M. Kentgens, G.H. Nachtegaal, Multiple Quantum ^{27}Al Magic-angle Spinning NMR Spectroscopic Study of $SrAl_{12}O_{19}$: Identification of a ^{27}Al Resonance from a Well-defined AlO_5 Site, J. Phys. Chem. 102 (1998) 5969-5976. https://doi.org/10.1021/jp981224v.

[45] M. Capron, F. Fayon, D. Massiot, A. Douy, $Sr_4Al_{14}O_{25}$: Formation, Stability, and ^{27}Al High-resolution NMR Characterization, Chem. Mater. 15 (2003) 575-579. https://doi.org/10.1021/cm0213265.

[46] R.S. Azis, D. Holland, M.E. Smith, A. Howes, M. Hashim, A. Zakaria, J. Hassan, N.M. Saiden, M.K. Ikhwan, DTA/TG, XRD and ^{27}Al MAS NMR of Yttrium Aluminium Garnet, $Y_3Al_5O_{12}$ by Sol-gel Synthesis, J. Austr. Cer. Soc. 49 (2013) 74-80.

[47] B.V. Padlyak, N.A. Sergeev, M. Olszewski, P. Stepien, The MAS NMR study of solid solutions based on the YAG crystal, Nukleonika 60 (2015) 417-421. https://doi.org/10.1515/nuka-2015-0074.

[48] U.G. Nielsen, A. Boisen, M. Brorson, C.J.H. Jacobsen, H.J. Jakobsen, J. Skibsted, Aluminum Orthovanadate ($AlVO_4$): Synthesis and Characterization by ^{27}Al and $_{51}$V MAS and MQMAS NMR Spectroscopy, Inorg. Chem. 41 (2002) 6432-6439. https://doi.org/10.1021/ic0204023.

[49] L.A. O'Dell, S.L.P. Savin, A.V. Chadwick, M.E. Smith, A ^{27}Al, ^{29}Si, ^{25}Mg and ^{17}O NMR Investigation of Alumina and Silica Zener Pinned, Sol-Gel Prepared Nanocrystalline ZrO_2 and MgO, Faraday Discuss. 134 (2007) 83-102. https://doi.org/10.1039/b601928e.

[50] B. Zibrowius, M. Fischer, ^{27}Al NMR spectroscopic and DFT computational study of the quadrupole coupling of aluminum in two polymorphs of the complex aluminum hydride $CsAlH_4$, J. Chem. Phys. 162 (2025). https://doi.org/10.1063/5.0243835.

[51] B. Zibrowius, M. Felderhoff, On the preparation and NMR spectroscopic characterization of potassium aluminium tetrahydride $KAlH_4$, Phys. Chem. Chem. Phys. 21 (2019) 12576-12584. https://doi.org/10.1039/c9cp01059a.

[52] B. Zibrowius, M. Fischer, On the Use of Solomon Echoes in ^{27}Al NMR Studies of Complex Aluminium Hydrides, ChemistryOpen 13 (2024) e202300011 pp. 202300019. https://doi.org/10.1002/open.202300011.

[53] J.X. Zhang, M.A. Pilette, F. Cuevas, T. Charpentier, F. Mauri, M. Latroche, X-ray Diffraction and NMR Studies of $Na_{3-n}Li_nAlH_6$ (n = 0, 1, 2) Alanates Synthesized by High-Pressure Reactive Ball Milling, J. Phys. Chem. C 113 (2009) 21242-21252. https://doi.org/10.1021/jp9044995.

[54] B. Nowak, S. Hayashi, Al-27 NMR study in ZrNiAl, Solid State Nuclear Magnetic Resonance 18 (2000) 59-69. https://doi.org/10.1006/snmr.2000.0011.

[55] E. Lippmaa, A. Samoson, M. Mägi, High-resolution ^{27}Al NMR of Aluminosilicates, J. Am. Chem. Soc. 108 (1986) 1730-1735. https://doi.org/10.1021/ja00268a002.

[56] H. Koller, T. Uesbeck, M.R. Hansen, M. Hunger, Characterizing the First and Second ^{27}Al Neighbors of Bronsted and Lewis Acid Protons in Zeolites and the Distribution of ^{27}Al Quadrupolar Couplings by ^{1}H{^{27}Al} Offset REAPDOR, J. Phys. Chem. C 121 (2017) 25930-25940. https://doi.org/10.1021/acs.jpcc.7b09544.

[57] D. Freude, H. Ernst, I. Wolf, Solid-state NMR Studies of Acid Sites in Zeolites, Solid State Nucl. Magn. Reson. 3 (1994) 271-286. https://doi.org/10.1016/0926-2040(94)90003-5.

[58] C.P. Grey, A.J. Vega, Determination of the Quadrupole Coupling Constant of the Invisible Aluminum Spins in Zeolite HY with ^{1}H-/^{27}Al TRAPDOR, J. Am. Chem. Soc. 117 (1995) 8232-8242. https://doi.org/10.1021/ja00136a022.

[59] K.U. Gore, A. Abraham, S.G. Hegde, R. Kumar, J.P. Amoureux, S. Ganapathy, ^{29}Si and ^{27}Al MAS/3Q-MAS NMR Studies of High Silica USY Zeolites, J. Phys. Chem. B 106 (2002) 6115-6120. https://doi.org/10.1021/jp0143241.

[60] M.J. Zheng, Q. Wang, Y.Y. Chu, X.C. Tan, W.D. Huang, Y.J. Xi, Y.X. Wang, G.D. Qi, J. Xu, S.B. Hong, F. Deng, Revealing the Bronsted Acidic Nature of Penta-Coordinated Aluminum Species in Dealuminated Zeolite Y with Solid-State NMR Spectroscopy, J. Am. Chem. Soc. 146 (2024) 29417-29428. https://doi.org/10.1021/jacs.4c08408.

[61] S. Ganapathy, K.U. Gore, R. Kumar, J.P. Amoureux, Multinuclear (^{27}Al, ^{29}Si, ^{47,49}Ti) Solid-state NMR of Titanium Substituted Zeolite USY, Solid State Nucl. Magn. Reson. 24 (2003) 184-195. https://doi.org/10.1016/s0926-2040(03)00044-4.

[62] M. Hunger, T. Horvath, Multi-Nuclear Solid-State NMR Study of the Local Structure of SiOHAl Groups and their Interaction with Probe-Molecules in Dehydrated Faujasite, Mordenite and Zeolite ZSM-5, Ber. Bunsenges. Phys. Chem. 99 (1995) 1316-1320. https://doi.org/10.1002/bbpc.199500077.

[63] S. Ganapathy, R. Kumar, L. Delevoye, J.P. Amoureux, Identification of Distinct Bronsted Acidic Sites in Zeolite Mordenite by Proton Localization and ^{27}Al-^{1}H- REAPDOR NMR, Chem. Commun. (2003) 2076-2077. https://doi.org/10.1039/b304548j.

[64] A. Abraham, S.H. Lee, C.H. Shin, S.B. Hong, R. Prins, J.A. van Bokhoven, Influence of Framework Silicon to Aluminium Ratio on Aluminium Coordination and Distribution in Zeolite Beta Investigated by ^{27}Al MAS and ^{27}Al MQ MAS NMR, Phys. Chem. Chem. Phys. 6 (2004) 3031-3036. https://doi.org/10.1039/b401235f.

[65] R. Hajjar, Y. Millot, P.P. Man, M. Che, S. Dzwigaj, Two Kinds of Framework Al Sites Studied in BEA Zeolite by X-ray Diffraction, Fourier Transform Infrared Spectroscopy, NMR Techniques, and V Probe, J. Phys. Chem. C 112 (2008) 20167-20175. https://doi.org/10.1021/jp808356q.

[66] L. Kobera, J. Dedecek, P. Klein, E. Tabor, J. Brus, A.V. Fishchuk, S. Sklenak, Formation and local structure of framework Al Lewis sites in beta zeolites, J. Chem. Phys. 156 (2022) 104702. https://doi.org/10.1063/5.0083666.

[67] K.Z. Chen, Z.H. Gan, S. Horstmeier, J.L. White, Distribution of Aluminum Species in Zeolite Catalysts: ^{27}Al NMR of Framework, Partially-Coordinated Framework, and Non-Framework Moieties, J. Am. Chem. Soc. 143 (2021) 6669-6680. https://doi.org/10.1021/jacs.1c02361.

[68] Y. Ji, K.Z. Chen, X.W. Han, X.H. Bao, G.J. Hou, Precise Structural and Dynamical Details in Zeolites Revealed by Coupling-Edited ^{1}H-^{17}O Double Resonance NMR Spectroscopy, J. Am. Chem. Soc. 146 (2024) 11211-11224. https://doi.org/10.1021/jacs.3c14787.

[69] O.H. Han, C.S. Kim, S.B. Hong, Direct Evidence for the Nonrandom Nature of Al Substitution in Zeolite ZSM-5: An Investigation by ^{27}Al MAS and MQ MAS NMR, Angew. Chem. Int. Ed. 41 (2002) 469-472. https://doi.org/10.1002/1521-3773(20020201)41:3.

[70] A. Abraham, R. Prins, J.A. van Bokhoven, E.R.H. van Eck, A.P.M. Kentgens, TRAPDOR Double-resonance and High-resolution MAS NMR for Structural and Template Studies in Zeolite ZSM-5, Solid State Nucl. Magn. Reson. 35 (2009) 61-66. https://doi.org/10.1016/j.ssnmr.2009.01.004.

[71] J. Holzinger, M. Nielsen, P. Beato, R.Y. Brogaard, C. Buono, M. Dyballa, H. Falsig, J. Skibsted, S. Svelle, Identification of Distinct Framework Aluminum Sites in Zeolite ZSM-23: A Combined Computational and Experimental ^{27}Al NMR Study, J. Phys. Chem. C 123 (2019) 7831-7844. https://doi.org/10.1021/acs.jpcc.8b06891.

[72] R. Karcz, J. Dedecek, B. Supronowicz, H.M. Thomas, P. Klein, E. Tabor, P. Sazama, V. Pashkova, S. Sklenak, TNU-9 Zeolite: Aluminum Distribution and Extra-Framework Sites of Divalent Cations, Chem. Eur. J. 23 (2017) 8857-8870. https://doi.org/10.1002/chem.201605685.

[73] P. Klein, V. Pashkova, H.M. Thomas, S.R. Whittleton, J. Brus, L. Kobera, J. Dedecek, S. Sklenak, Local Structure of Cationic Sites in Dehydrated Zeolites Inferred from ^{27}Al Magic-Angle Spinning NMR and Density Functional Theory Calculations. A Study on Li-, Na-, and K-Chabazite, J. Phys. Chem. C 120 (2016) 14216-14225. https://doi.org/10.1021/acs.jpcc.6b04391.

[74] Z.P. Zhang, Y.M. Guo, X.L. Liu, Solid State NMR Techniques Study the Structural Characteristics of As-Synthesized ITQ-33, J. Phys. Chem. C 121 (2017) 11568-11575. https://doi.org/10.1021/acs.jpcc.7b02968.

[75] D. Müller, E. Jahn, G. Ladwig, U. Haubenreisser, High-resolution Solid-state ^{27}Al and ^{31}P NMR: Correlation between Chemical Shift and Mean Al-O-P Angle in $AlPO_4$ Polymorphs, Chem. Phys. Lett. 109 (1984) 332-336. https://doi.org/https://doi.org/10.1016/0009-2614(84)85596-7.

[76] M. Kovalakova, P. Grobet, The ^{27}Al DOR NMR Characterization of the Molecular Sieve $ALPO_4$-8, Solid State Nucl. Magn. Reson. 9 (1997) 107-113. https://doi.org/10.1016/S0926-2040(97)00050-7.

[77] M. Helliwell, V. Kaucic, G.M.T. Cheetham, M.M. Harding, B.M. Kariuki, P.J. Rizkallah, Structure Determination from Small Crystals of Two Aluminophosphates, CrAPO-14 AND SAPO-43, Acta Crystallogr. B 49 (1993) 413-420. https://doi.org/10.1107/s0108768192009005.

[78] C.A. Fyfe, H. Meyer zu Altenschildesche, K.C. Wong-Moon, H. Grondey, J.M. Chezeau, 1D and 2D Solid State NMR Investigations of the Framework Structure of As-synthesized $AlPO_4$-14, Solid State Nucl. Magn. Reson. 9 (1997) 97-106. https://doi.org/10.1016/S0926-2040(97)00049-0.

[79] C. Fernandez, J.P. Amoureux, J.M. Chezeau, L. Delmotte, H. Kessler, ^{27}Al MAS NMR Characterization of $AlPO_4$-14. Enhanced Resolution and Information by MQMAS, Microporous Mater. 6 (1996) 331-340. https://doi.org/0.1016/0927-6513(96)00040-5.

[80] S.E. Ashbrook, M. Cutajar, C.J. Pickard, R.I. Walton, S. Wimperis, Structure and NMR Assignment in Calcined and As-synthesized Forms of AlPO-14: A Combined Study by First-principles Calculations and High-resolution ^{27}Al-^{31}P MAS NMR Correlation, Phys. Chem. Chem. Phys. 10 (2008) 5754-5764. https://doi.org/10.1039/b805681a.

[81] D.H. Brouwer, J.M. Chezeau, C.A. Fyfe, Solid State NMR Investigation of the Structure of $AlPO_4$-14A, Microporous Mesoporous Mater. 88 (2006) 163-169. https://doi.org/10.1016/j.micromeso.2005.08.035.

[82] P.J. Byrne, J.E. Warren, R.E. Morris, S.E. Ashbrook, Structure and NMR Assignment in $AlPO_4$-15: A Combined Study by Diffraction, MAS NMR and First-principles Calculations, Solid State Sci. 11 (2009) 1001-1006. https://doi.org/10.1016/j.solidstatesciences.2009.02.002.

[83] D. Zhou, L. Chen, J. Yu, Y. Li, W. Yan, F. Deng, R. Xu, Synthesis, Crystal Structure, and Solid-State NMR Spectroscopy of a New Open-Framework Aluminophosphate (NH4)2Al4(PO4)4(HPO4)·H2O, Inorg. Chem. 44 (2005) 4391-4397. https://doi.org/10.1021/ic048476x.

[84] R. Jelinek, B.F. Chmelka, Y. Wu, P.J. Grandinetti, A. Pines, P.J. Barrie, J. Klinowski, Study of the Aluminophosphates $AlPO_4$-21 and $AlPO_4$-25 by ^{27}Al Double-rotation NMR, J. Am. Chem. Soc. 113 (1991) 4097-4101. https://doi.org/10.1021/ja00011a007.

[85] D.M. Dawson, J.M. Griffin, V.R. Seymour, P.S. Wheatley, M. Amri, T. Kurkiewicz, N. Guillou, S. Wimperis, R.I. Walton, S.E. Ashbrook, A Multinuclear NMR Study of Six Forms of AlPO-34: Structure and Motional Broadening, J. Phys. Chem. C 121 (2017) 1781-1793. https://doi.org/10.1021/acs.jpcc.6b11908.

[86] S.E. Ashbrook, M. Cutajar, J.M. Griffin, Z.A.D. Lethbridge, R.I. Walton, S. Wimperis, Transformation of AlPO-53 to JDF-2: Reversible Dehydration of a Templated Aluminophosphate Studied by MAS NMR and Diffraction, J. Phys. Chem. C 113 (2009) 10780-10789. https://doi.org/10.1021/jp902074s.

[87] A. Bailly, J.P. Amoureux, J.W. Wiench, M. Pruski, Structural Analysis of ZON-type Aluminophosphates by Solid State NMR, J. Phys. Chem. B 105 (2001) 773-776. https://doi.org/10.1021/jp0027795.

[88] J.J. Ren, L. Zhang, H. Eckert, Medium-Range Order in Sol-Gel Prepared Al_2O_3-SiO_2 Glasses: New Results from Solid-State NMR, J. Phys. Chem. C 118 (2014) 4906-4917. https://doi.org/10.1021/jp412774h.

[89] N. González-Camuñas, A. Cantin, D.M. Dawson, M.M. Lozinska, J. Martínez-Triguero, J. Mattock, P.A. Cox, S.E. Ashbrook, P.A. Wright, F. Rey, Synthesis of the large pore aluminophosphate STA-1 and its application as a catalyst for the Beckmann rearrangement of cyclohexanone oxime, J. Mater. Chem. A 12 (2024) 15398-15411. https://doi.org/10.1039/d4ta01132e.

[90] M. Castro, V.R. Seymour, D. Carnevale, J.M. Griffin, S.E. Ashbrook, P.A. Wright, D.C. Apperley, J.E. Parker, S.P. Thompson, A. Fecant, N. Bats, Molecular Modeling, Multinuclear NMR, and Diffraction Studies in the Templated Synthesis and Characterization of the Aluminophosphate Molecular Sieve STA-2, J. Phys. Chem. C 114 (2010) 12698-12710. https://doi.org/10.1021/jp104120y.

[91] V.R. Seymour, E.C.V. Eschenroeder, M. Castro, P.A. Wright, S.E. Ashbrook, Application of NMR Crystallography to the Determination of the Mechanism of Charge-Balancing in Organocation-Templated AlPO STA-2, Crystengcomm 15 (2013) 8668-8679. https://doi.org/10.1039/c3ce40965a.

[92] K. Asselman, S. Radhakrishnan, N. Pellens, C.V. Chandran, M. Houlleberghs, Y.J. Xu, J.A. Martens, S.P. Sree, C.E.A. Kirschhock, E. Breynaert, HSIL-Based Synthesis of Ultracrystalline K,Na-JBW, a Zeolite Exhibiting Exceptional Framework Ordering and Flexibility, Chem. Mater. (2022). https://doi.org/10.1021/acs.chemmater.2c01059.

[93] H. Trill, H. Eckert, V.I. Srdanov, Mixed Halide Sodalite Solid Solution Systems. Hydrothermal Synthesis and Structural Characterization by Solid State NMR, J. Phys. Chem. B 107 (2003) 8779-8788. https://doi.org/10.1021/jp0224618.

[94] S.W. Ding, C.A. McDowell, High resolution ^{23}Na and ^{27}A NMR Satellite Transition Spectroscopy (SATRAS) of Natural Sodalite ($Na_8Cl_2(AlSiO_4)_6$) under Magic-angle-spinning, Chem. Phys. Lett. 333 (2001) 413-418. https://doi.org/10.1016/S0009-2614(00)01403-2.

[95] N.C. Nielsen, H. Bildsoe, H.J. Jakobsen, P. Norby, ^{7}Li, ^{23}Na and ^{27}Al Quadrupolar Interactions in Some Aluminosilicate Sodalites from MAS NMR Spectra of Satellite Transitions, Zeolites 11 (1991) 622-632. https://doi.org/10.1016/S0144-2449(05)80015-6.

[96] H. Trill, H. Eckert, V.I. Srdanov, Topotactic Transformations of Sodalite Cages: Synthesis and NMR Study of Mixed Salt-free and Salt-bearing Socialites, J. Am. Chem. Soc. 124 (2002) 8361-8370. https://doi.org/10.1021/ja012765s.

[97] L. Peters, K. Knorr, M. Fechtelkord, P. Appel, W. Depmeier, Structural Variations in the Solid Solution Series of Sodalite-type $(Eu_xCa_{2-x})_4(OH)_8$ $(Al_{2+x}Si_{1-x})_4O_{24}$ -SOD with $0 \le x \le 1$, Determined by X-ray Powder Diffraction and ^{27}Al MAS NMR Spectroscopy, Z. Kristallographie 221 (2006) 643-648. https://doi.org/10.1524/zkri.2006.221.9.643.

[98] F. Heiden, U.G. Nielsen, T.E. Warner, Synthesis and Thermal Stability of the Sodalite $Na_6Zn_2[Al_6Si_6O_{24}](SO_4)_2$ and its Reaction with Hydrogen, Microporous Mesoporous Mater. 161 (2012) 91-97. https://doi.org/10.1016/j.micromeso.2012.05.020.

[99] H. Kosslick, G. Lischke, G. Walther, W. Storek, A. Martin, R. Fricke, Physico-Chemical and Catalytic Properties of Al-, Ga- and Fe-Substituted Mesoporous Materials Related to MCM-41, Microporous Mater. 9 (1997) 13-33. https://doi.org/10.1016/S0927-6513(96)00087-9.

[100] Q.J. Zheng, R.E. Youngman, C.L. Hogue, J.C. Mauro, M. Potuzak, M.M. Smedskjaer, Y.Z. Yue, Structure of Boroaluminosilicate Glasses: Impact of Al_2O_3 / SiO_2 Ratio on the Structural Role of Sodium, Phys. Rev. B 86 (2012). https://doi.org/10.1103/PhysRevB.86.054203.

[101] A. Baasner, B.C. Schmidt, R. Dupree, S.L. Webb, Fluorine Speciation as a Function of Composition in Peralkaline and Peraluminous Na_2O-CaO-Al_2O_3-SiO_2 glasses: A multinuclear NMR study, Geochim. Cosmochim. Acta 132 (2014) 151-169. https://doi.org/10.1016/j.gca.2014.01.041.

[102] M. Paris, The Two Aluminum Sites in the ^{27}Al MAS NMR Spectrum of Kaolinite: Accurate Determination of Isotropic Chemical Shifts and Quadrupolar Interaction Parameters, Am. Mineral. 99 (2014) 393-400. https://doi.org/10.2138/am.2014.4607.

[103] D. Massiot, Sensitivity and Lineshape Improvements of MQ-MAS by Rotor-Synchronized Data Acquisition, J. Magn. Reson. A 122 (1996) 240-244. https://doi.org/10.1006/jmra.1996.0202.

[104] L.B. Alemany, S. Steuernagel, J.P. Amoureux, R.L. Callender, A.R. Barron, Very Fast MAS and MQMAS NMR Studies of the Spectroscopically Challenging Minerals Kyanite and Andalusite on 400, 500, 800 MHz Spectrometers, Solid State Nucl. Magn. Reson. 14 (1999) 1-18. https://doi.org/10.1016/s0926-2040(99)00011-9.

[105] J.J. Fitzgerald, S.F. Dec, A.I. Hamza, Observation of 5-coordinated Al in Pyrophyllite Dehydroxylate by Solid-state ^{27}Al NMR Spectroscopy at 14 T, Am. Mineral. 74 (1989) 1405-1408.

[106] D.L. Carroll, T.F. Kemp, T.J. Bastow, M.E. Smith, Solid-state NMR Characterisation of the Thermal Transformation of a Hungarian White Illite, Solid State Nucl. Magn. Reson. 28 (2005) 31-43. https://doi.org/10.1016/j.ssnmr.2005.04.001.

[107] G. Kunath-Fandrei, P. Rehak, S. Steuernagel, H. Schneider, C. Jäger, Quantitative Structural Analysis of Mullite by ^{27}Al NMR Satellite Transition Spectroscopy, Solid State Nucl. Magn. Reson. 3 (1994) 241-248. https://doi.org/10.1016/0926-2040(94)90001-9.

[108] P.R. Bodart, J. Parmentier, R.K. Harris, D.P. Thompson, Aluminium Environments in Mullite and an Amorphous Sol-Gel Precursor Examined by ^{27}Al-27 Triple-quantum MAS NMR, J. Phys. Chem. Solids 60 (1999) 223-228. https://doi.org/10.1016/s0022-3697(98)00275-3.

[109] J. McManus, S.E. Ashbrook, K.J.D. MacKenzie, S. Wimperis, ^{27}Al Multiple-quantum MAS and ^{27}Al-{^{1}H} CPMAS NMR Study of Amorphous Aluminosilicates, J. Non-Cryst. Solids 282 (2001) 278-290. https://doi.org/10.1016/s0022-3093(01)00313-1.

[110] K.E. Kelsey, J.F. Stebbins, L.S. Du, B. Hankins, Constraining ^{17}O and ^{27}Al NMR Spectra of High-pressure Crystals and Glasses: New Data for Jadeite, Pyrope, Grossular, and Mullite, Am. Mineral. 92 (2007) 210-216. https://doi.org/10.2138/am.2007.2284.

[111] L.B. Alemany, R.L. Callender, A.R. Barron, S. Steuernagel, D. Iuga, A.P.M. Kentgens, Single-Pulse MAS, Selective Hahn Echo MAS, and 3QMAS NMR Studies of the Mineral Zoisite at 400, 500, 600, and 800 MHz. Exploring the Limits of Al NMR Detectability, J. Phys. Chem. B. 104 (2000) 11612-11616. https://doi.org/10.1021/jp002066m.

[112] M. Goswami, P.J.M. van Bentum, A.P.M. Kentgens, Repetitive Sideband-selective Double Frequency Sweeps for Sensitivity Enhancement of MAS NMR of Half-integer Quadrupolar Nuclei, J. Magn. Reson. 219 (2012) 25-32. https://doi.org/10.1016/j.jmr.2012.04.007.

[113] R.L. Flemming, V. Terskikh, E. Ye, Aluminum Environments in Synthetic Ca-Tschermak Cinopyroxene ($CaAlAlSiO_6$) from Rietveld Refinement, ^{27}Al NMR, and First-principles Calculations, Am. Mineral. 100 (2015) 2219-2230. https://doi.org/10.2138/am-2015-5348.

[114] M. Capron, F. Fayon, J. Coutures, D. Massiot, A. Douy, Synthesis and Structural Characterisation of $Sr_3Al_{10}SiO_{20}$ by XRD and Solid-state NMR, J. Solid State Chem. 169 (2002) 53-59. https://doi.org/10.1016/s0022-4596(02)00016-6.

[115] J.H. Baltisberger, Z. Xu, J.F. Stebbins, S.H. Wang, A. Pines, Triple-quantum Two-dimensional ^{27}Al MAS NMR Spectroscopic Study of Aluminosilicate and Aluminate Crystals and Glasses, J. Am. Chem. Soc. 118 (1996) 7209-7214. https://doi.org/10.1021/ja9606586.

[116] B. Sulikowski, Solid-state ^{29}Si and ^{27}Al NMR Studies of Natural Mesolite, Microporous Mesoporous Mater. 206 (2015) 144-149. https://doi.org/10.1016/j.micromeso.2014.12.024.

[117] J. Skibsted, P. Norby, H. Bildsoe, H.J. Jakobsen, Line Shapes and Widths of MAS Sidebands for ^{27}Al Satellite Transitions - Multinuclear MAS NMR of Tugtupite $Na_8Al_2Be_2Si_8O_{24}Cl_2$, Solid State Nucl. Magn. Reson. 5 (1995) 239-255. https://doi.org/10.1016/0926-2040(95)01195-7.

[118] R.J. Kirkpatrick, R.A. Kinsey, K.A. Smith, D.M. Henderson, E. Oldfield, High Resolution Solid-state ^{23}Na, ^{27}Al, and ^{29}Si NMR Spectroscopic Reconnaissance of Alkali and Plagioclase Feldspars, Am. Mineral. 70 (1985) 106-123.

[119] P.S. Neuhoff, S. Kroeker, L.S. Du, T. Fridriksson, J.F. Stebbins, Order/Disorder in Natrolite Group Zeolites: A ^{29}Si and ^{27}Al MAS NMR Study, Am. Mineral. 87 (2002) 1307-1320. https://doi.org/10.2138/am-2002-1006.

[120] L. Sanchez-Munoz, J. Sanz, I. Sobrados, Z.H. Gan, Medium-range Order in Disordered K-feldspars by Multinuclear NMR, Am. Mineral. 98 (2013) 2115-2131. https://doi.org/10.2138/am.2013.4448.

[121] M.E. Smith, S. Steuernagel, A Multinuclear Magnetic Resonance Examination of the Minerale Grandidierite, Solid State Nucl. Magn. Reson. 1 (1992) 175-183. https://doi.org/10.1016/S0926-2040(10)80002-5.

[122] L. Delevoye, S.X. Liu, M.D. Welch, C. Fernandez, J.P. Amoureux, J. Klinowski, Triple-quantum ^{27}Al and ^{23}Na MAS NMR Study of Amphiboles, J. Chem. Soc., Faraday Trans. 93 (1997) 2591-2595. https://doi.org/10.1039/A701848G.

[123] W.F. Bleam, S.F. Dec, J.S. Frye, Al-27 Solid-state NMR Study of Five-coordinate Aluminum in Augelite and Senegalite, Phys. Chem. Minererals 16 (1989) 817-820. https://doi.org/10.1007/BF00209706.

[124] D. Müller, I. Grunze, E. Hallas, G. Ladwig, Hochfeld-27Al-NMR-Untersuchungen zur Aluminiumkoordination in kristallinen Aluminiumpohosphaten, Z. Anorg. Allg. Chem. 500 (1983) 80-88. https://doi.org/10.1002/zaac.19835000511.

[125] L. Beitone, C. Huguenard, A. Gansmuller, M. Henry, F. Taulelle, T. Loiseau, G. Ferey, Order-Disorder in the Super-Sodalite $Zn_3Al_6(PO_4)_{12}$, 4*tren*, $17H_2O$ (MIL-74): A Combined XRD-NMR Assessment, J. Am. Chem. Soc. 125 (2003) 9102-9110. https://doi.org/10.1021/ja0294818.

[126] B. Bouchevreau, C. Martineau, C. Mellot-Draznieks, A. Tuel, M.R. Suchomel, J. Trebosc, O. Lafon, J.P. Amoureux, F. Taulelle, High-Resolution Structural Characterization of Two Layered Aluminophosphates by Synchrotron Powder Diffraction and NMR Crystallographies, Chem. Mater. 25 (2013) 2227-2242. https://doi.org/10.1021/cm4004799.

[127] B.G. Aitken, R.E. Youngman, R.R. Deshpande, H. Eckert, Structure-Property Relations in Mixed-Network Glasses: Multinuclear Solid State NMR Investigations of the System $x Al_2O_3$:(30-x)P_2O_5:70SiO_2, J. Phys. Chem. C 113 (2009) 3322-3331. https://doi.org/10.1021/jp809208m.

[128] A. Bressel, J. Frey, U. Filek, B. Sulikowski, D. Freude, M. Hunger, Oxygen Coordination of Aluminum Cations in Dehydrated $AlPW_{12}O_{40}$ Investigated by Solid-state NMR Spectroscopy, Chem. Phys. Lett. 487 (2010) 285-290. https://doi.org/10.1016/j.cplett.2010.01.048.

[129] H. Bradtmüller, L. Zhang, C.C. de Araujo, H. Eckert, D. Moncke, D. Ehrt, Structural Studies of $NaPO_3$-AlF_3 Glasses by High-Resolution Double-Resonance Nuclear Magnetic Resonance Spectroscopy, J. Phys. Chem. C 122 (2018) 21579-21588. https://doi.org/10.1021/acs.jpcc.8b06162.

[130] C.L. Turner, D. Koumoulis, G. Li, Z. Zujovic, R.E. Taylor, R.B. Kaner, Synthesis and Characterization of Aluminum Diboride Products Using ^{27}Al, ^{11}B NMR and ab initio studies, J. Mater. Sci. 53 (2018) 3309-3322. https://doi.org/10.1007/s10853-017-1727-9.

[131] D. Massiot, D. Müller, T. Hubert, M. Schneider, A.P.M. Kentgens, B. Cote, J.P. Coutures, W. Gessner, Double Rotation and Magic-angle Spinning NMR Study of ^{27}Al: Reexamination of the Aluminium Borate $9Al_2O_3$ $2B_2O_3$, Solid State Nucl. Magn. Reson. 5 (1995) 175-180. https://doi.org/10.1016/0926-2040(95)00021-H.

[132] S. Wittmann, M.M. Murshed, V. Bilovol, A. Koldemir, R. Pöttgen, U.G. Nielsen, T.M. Gesing, Mullite-type $EMBO_4$: synthesis, structural, optical, and vibrational properties of rare tin(II) borates with M = Al and Ga, J. Am. Cer. Soc. 107 (2024) 1302–1314. https://doi.org/10.1111/jace.19476.

[133] K.J.D. MacKenzie, M.E. Smith, T.F. Kemp, D. Voll, Crystalline aluminium borates with the mullite structure: A B-11 and Al-27 solid-state NMR study, Applied Magnetic Resonance 32 (2007) 647-662. https://doi.org/10.1007/s00723-007-0044-x.

[134] F.A. Perras, D.L. Bryce, Multinuclear Magnetic Resonance Crystallographic Structure Refinement and Cross-Validation Using Experimental and Computed Electric Field Gradients: Application to $Na_2Al_2B_2O_7$, J. Phys. Chem. C 116 (2012) 19472-19482. https://doi.org/10.1021/jp308273h.

[135] M. Bertmer, L. Zuchner, J.C.C. Chan, H. Eckert, Short and Medium Range Order in Sodium Aluminoborate glasses. 2. Site Connectivities and Cation Distributions Studied by Rotational Echo Double Resonance NMR Spectroscopy, J. Phys. Chem. B 104 (2000) 6541-6553. https://doi.org/10.1021/jp9941918.

[136] M. Body, C. Legein, J.Y. Buzare, G. Silly, The Relationship Between ^{27}Al Quadrupolar Parameters and AlF_6^{3-} Octahedron Connectivity in Crystalline and Glassy Fluoroaluminates, Eur. J. Inorg. Chem. (2007) 1980-1988. https://doi.org/10.1002/ejic.200601148.

[137] M. Body, C. Legein, J.Y. Buzare, G. Silly, P. Blaha, C. Martineau, F. Calvayrac, Advances in Structural Analysis of Fluoroaluminates Using DFT Calculations of ^{27}Al Electric Field Gradients, J. Phys.Chem. A 111 (2007) 11873-11884. https://doi.org/10.1021/jp0740696.

[138] G. Silly, C. Legein, J.Y. Buzare, F. Calvayrac, Electric Field Gradients in Fluoride Crystalline Powders: Correlation of NMR Measurements with *ab initio* Calculations, Solid State Nucl. Magn. Reson. 25 (2004) 241-251. https://doi.org/10.1016/j.ssnmr.2003.09.001.

[139] P.J. Dirken, J.B.H. Jansen, R.D. Schuiling, Influence of Octahedral Polymerization on ^{23}Na and ^{27}Al MAS NMR in Alkali Fluoroaluminates, Am. Mineral. 77 (1992) 718-724.

[140] D. Dambournet, A. Demourgues, C. Martineau, S. Pechev, J. Lhoste, J. Majimel, A. Vimont, J.C. Lavalley, C. Legein, J.Y. Buzare, F. Fayon, A. Tressaud, Nanostructured Aluminium Hydroxyfluorides Derived from β-AlF_3, Chem. Mater. 20 (2008) 1459-1469. https://doi.org/10.1021/cm702603b.

[141] A. Pawlik, R. Konig, G. Scholz, E. Kemnitz, G. Brunklaus, M. Bertmer, C. Jager, Access to Local Structures of HS-AlF_3 and Its Precursor Determined by High-Resolution Solid-State NMR, J. Phys. Chem. C 113 (2009) 16674-16680. https://doi.org/10.1021/jp904626k.

[142] D. Müller, U. Bentrup, ^{27}Al NMR Studies on Alkali Fluoroaluminates, Z. Anorg. Allg. Chem. 575 (1989) 17-25. https://doi.org/10.1002/zaac.19895750104.

[143] F. Simko, A. Rakhmatullin, E. Veron, M. Allix, P. Florian, M. Kontrik, Z. Netriova, M. Korenko, V. Kavecansky, C. Bessada, Oxo- and Oxofluoroaluminates in the RbF-Al_2O_3 System: Synthesis and Structural Characterization, Inorg. Chem. 57 (2018) 13702-13712. https://doi.org/10.1021/acs.inorgchem.8b02275.

[144] S. Sakida, M. Shojiya, Y. Kawamoto, ^{27}Al MAS NMR Study on Anion Coordination Around Al^{3+} in AlF_3-BaF_2-$BaCl_2$-CaF_2-YF_3-EuF_3 Glasses, J. Fluorine Chem. 106 (2000) 127-131. https://doi.org/10.1016/s0022-1139(00)00314-6.

[145] M. Body, G. Silly, C. Legein, J.Y. Buzare, F. Calvayrac, P. Blaha, ^{27}Al NMR Experiments and Quadrupolar Parameter *ab initio* Calculations: Crystallographic Structure Refinement of β-Ba_3AlF_9, Chem. Phys. Lett. 424 (2006) 321-326. https://doi.org/10.1016/j.cplett.2006.04.091.

[146] M. Body, G. Silly, C. Legein, J.Y. Buzare, F. Calvayrac, P. Blaha, Structural Investigations of β-$CaAlF_5$ by Coupling Powder XRD, NMR, EPR and Spectroscopic Parameter Calculations, J. Solid State Chem. 178 (2005) 3655-3661. https://doi.org/10.1016/j.jssc.2005.09.021.

[147] B. Zhou, B.L. Sherriff, F. Taulelle, Nuclear Magnetic Resonance Study of Al : Si and F : OH Order in Zunyite, Can. Mineral. 41 (2003) 891-903. https://doi.org/10.2113/gscanmin.41.4.891.

[148] B. Zhou, B.L. Sherriff, J.S. Hartman, G. Wu, Al-17 and Na-23 NMR spectroscopy and structural modeling of aluminofluoride minerals, American Mineralogist 92 (2007) 34-43. https://doi.org/10.2138/am.2007.2269.

[149] C. Martineau, M. Body, C. Legein, G. Silly, J.Y. Buzare, F. Fayon, Multinuclear High-resolution NMR Study of Compounds from the Ternary System NaF-CaF_2-AlF_3: From Determination to Modeling of NMR Parameters, Inorg. Chem. 45 (2006) 10215-10223. https://doi.org/10.1021/ic061348j.

[150] K.J.D. MacKenzie, M.E. Smith, Multinuclear Solid-state NMR of Inorganic Materials, Pergamon, Elsevier Science, Oxford, 2002.

[151] T. Bräuniger, P. Kempgens, R.K. Harris, A.P. Howes, K. Liddell, D.P. Thompson, A Combined $^{14}N/^{27}Al$ Nuclear Magnetic Resonance and Powder X-ray Diffraction Study of Impurity Phases in β-sialon Ceramics, Solid State Nucl. Magn. Reson. 23 (2003) 62-76. https://doi.org/10.1016/s0926-2040(02)00016-4.

[152] M.E. Smith, ^{29}Si and ^{27}Al Magic-angle Spinning Nuclear Magnetic Resonance of SiAlON X-phase, Solid State Nucl. Magn. Reson. 3 (1994) 111-114. https://doi.org/10.1016/0926-2040(94)90030-2.

[153] J.J. Fitzgerald, S.D. Kohl, G. Piedra, S.F. Dec, G.E. Maciel, Observation of 4-coordinate Aluminum Oxynitride ($AlO_{4-x}N_x$) Environments in AlON Solids by MAS ^{27}Al NMR at 14 T, Chem. Mater. 6 (1994) 1915-1917. https://doi.org/10.1021/cm00047a005.

[154] Z. Wang, B.T. Tu, Q.G. Chen, H. Wang, W.M. Wang, Z.Y. Fu, Crystal structure investigation of spinel-type LiAlON with multiple atomic disorders, J. Am. Cer. Soc. 106 (2023) 7133-7140. https://doi.org/10.1111/jace.19328.

[155] M. Kubus, K. Levin, S. Kroeker, D. Enseling, T. Justel, H.J. Meyer, Structural and Luminescence SWtudies of the New Nitridomagnesoaluminate $CaMg_2AlN_3$, Dalton Trans. 44 (2015) 2819-2826. https://doi.org/10.1039/c4dt03283g.

[156] T. Bräuniger, C.V. Chandran, U. Wedig, M. Jansen, NMR Chemical Shift and Quadrupolar Interaction Parameters of Carbon-Coordinated ^{27}Al in Aluminium Carbide, Al_4C_3, Z. Anorg. Allg. Chem. 637 (2011) 530-535. https://doi.org/10.1002/zaac.201000445.

[157] R.M. Marti, V. Sarou-Kanian, C.M. Moran, K.S. Walton, S.E. Hayes, NMR Crystallography of Aluminum Carbide: Impurities in the Reagent and Improved ^{27}Al NMR Tensors, J. Phys. Chem. C 124 (2020) 7238-7243. https://doi.org/10.1021/acs.jpcc.9b11579.

[158] R.W. Schurko, R.E. Wasylishen, H. Förster, Characterization of Anisotropic Aluminium Magnetic Shielding Tensors. Distorted Octahedral Complexes and Linear Molecules, J. Phys. Chem. A 102 (1998) 9750-9760. https://doi.org/10.1021/jp982367k.

[159] J.B.D. de la Caillerie, P.P. Man, M.A. Vicente, J.F. Lambert, ^{27}Al MQ-MAS NMR as a Tool for Structure Determination in Nanocomposite Materials: The Nature of Al Pillars in "Al_{13}-heidi" Pillared Clays, J. Phys. Chem. B 106 (2002) 4133-4138. https://doi.org/10.1021/jp014024j.

[160] W.H. Casey, M.M. Olmstead, B.L. Phillips, A New Aluminum Hydroxide Octamer, $[Al_8(OH)_{14}(H_2O)_{18}](SO_4)_5 \cdot 16H_2O$, Inorg. Chem. 44 (2005) 4888-4890. https://doi.org/10.1021/ic050426k.

[161] T.J. Bastow, P.J. Dirken, M.E. Smith, T.W. Turney, ^{23}Na and ^{27}Al NMR Study of the products from Carbonation of a Bayer Liquor, J. Mater. Chem. 5 (1995) 521-525. https://doi.org/10.1039/jm9950500521.

[162] M.T. Pedersen, F. Jensen, J. Skibsted, Structural Investigation of Ye'elimite, $Ca_4Al_6O_{12}SO_4$, by ^{27}Al MAS and MQMAS NMR at Different Magnetic Fields, J. Phys. Chem. C 122 (2018) 12077-12089. https://doi.org/10.1021/acs.jpcc.8b02497.

[163] J. Skibsted, M.T. Pedersen, J. Holzinger, Resolution of the Two Aluminum Sites in Ettringite by ^{27}Al MAS and MQMAS NMR at Very High Magnetic Field (22.3 T), J. Phys. Chem. C 121 (2017) 4011-4017. https://doi.org/10.1021/acs.jpcc.6b11875.

[164] S. Nie, J. Skibsted, Characterization of Monochromate and Hemichromate AFm Phases and Chromate-Containing Ettringite by 1H, 27Al, and 53Cr MAS NMR Spectroscopy, 12 (2022). https://doi.org/10.3390/min12030371.

[165] E. Grube, U.G. Nielsen, The Stoichiometry of Synthetic Alunite as a Function of Hydrothermal Aging Investigated by Solid-state NMR Spectroscopy, Powder X-ray Diffraction and Infrared Spectroscopy, Phys. Chem. Minerals 42 (2015) 337-345. https://doi.org/10.1007/s00269-014-0724-7.

[166] S. Radhakrishnan, K. Lauwers, C.V. Chandran, J. Trébosc, S. Pulinthanathu Sree, J.A. Martens, F. Taulelle, C.E.A. Kirschhock, E. Breynaert, NMR Crystallography Reveals Carbonate Induced Al-Ordering in ZnAl Layered Double Hydroxide, Chem. Eur. J. 27 (2021) 15944-15953. https://doi.org/https://doi.org/10.1002/chem.202101275.

[167] J. Skibsted, H.J. Jakobsen, C. Hall, Direct Observation of Aluminium Guest Ions in the Silicate Phases of Cement Minerals by ^{27}Al MAS NMR Spectroscopy, J. Chem. Soc., Faraday Trans. 90 (1994) 2095-2098. https://doi.org/10.1039/FT9949002095.

[168] R.J. McCarty, J.F. Stebbins, Constraints on Aluminum and Scandium Substitution Mechanisms in Forsterite, Periclase, and Larnite: High-Resolution NMR, Am. Mineral. 102 (2017) 1244-1253. https://doi.org/10.2138/am-2017-5976.

[169] L. Martel, S. Cadars, E. Veron, D. Massiot, M. Deschamps, Effects of the Orientation of the ^{23}Na-^{29}Si Dipolar Vector on the Dipolar Mediated Heteronuclear Solid State NMR Correlation Spectrum of Crystalline Sodium Silicates, Solid State Nucl. Magn. Reson. 45-46 (2012) 1-10. https://doi.org/10.1016/j.ssnmr.2012.04.001.

[170] T.M. Clark, P.J. Grandinetti, P. Florian, J.F. Stebbins, An ^{17}O NMR Investigation of Crystalline Sodium Metasilicate: Implications for the Determination of Local Structure in Alkali Silicates, J. Phys. Chem. B. 105 (2001) 12257-12265. https://doi.org/10.1021/jp011289p.

[171] H. Koller, G. Engelhardt, A.P.M. Kentgens, J. Sauer, ^{23}Na NMR Spectroscopy of Solids - Interpretation of Quadrupole Interaction Parameters and Chemical Shifts, J. Phys. Chem. 98 (1994) 1544-1551. https://doi.org/10.1021/j100057a004.

[172] S. Hayashi, MAS NMR of Half-Integer Quadrupole Nuclei - Effect of Spin-Locking Efficiency on Powder Lineshapes, Solid State Nucl. Magn. Reson. 3 (1994) 93-101. https://doi.org/10.1016/0926-2040(94)90027-2.

[173] X. Xue, J.F. Stebbins, Na-23 NMR Chemical Shifts and Local Na Coordination Environments in Silicate Crystals, Melts and Glasses, Phys. Chem. Mineral. 20 (1993) 297-307. https://doi.org/10.1007/BF00215100.

[174] D. Heidemann, C. Hubert, W. Schwieger, P. Grabner, K.H. Bergk, P. Sarv, ^{29}Si and ^{23}Na Solid-state MAS NMR investigations of Modifications of the Sodium Phyllosilicate $Na_2Si_2O_5$, Z. Anorg. Allg. Chem. 617 (1992) 169-177. https://doi.org/10.1002/zaac.19926170129.

[175] X.J. Ai, L. Chen, J.X. Dong, C.H. Ye, F. Deng, Variation of Sodium Coordination During the Hydration Processes of Layered Sodium Disilicates as Studied by ^{23}Na MQMAS and ^{1}H <-> ^{23}Na CP/MAS NMR spectroscopy, J. Mater. Chem. 13 (2003) 614-621. https://doi.org/10.1039/b209578e.

[176] X.Y. Wen, X.J. Ai, J.X. Dong, J. Yang, C.H. Ye, F. Deng, Reaction of Layered Sodium Disilicate SKS-6 with Calcium Chloride Solution as Revealed by Solid State NMR Spectroscopy: Exploring the Calcium Ion Extracting Mechanism of SKS-6, Solid State Nucl. Magn. Reson. 30 (2006) 89-97. https://doi.org/10.1016/j.ssnmr.2006.03.002.

[177] M. Hanaya, R.K. Harris, Two-dimensional ^{23}Na MQ MAS NMR Study of Layered Silicates, J. Mater. Chem. 8 (1998) 1073. https://doi.org/10.1039/A707764E.

[178] A. Matijasic, A.R. Lewis, C. Marichal, L. Delmotte, J.M. Chezeau, J. Patarin, Structural Characterization of the New Porous Sodium Silicate Mu-11 by Si-29 and Na-23 Solid-state NMR, Phys. Chem. Chem. Phys. 2 (2000) 2807-2813. https://doi.org/10.1039/b002194f.

[179] G. Engelhardt, H. Koller, A Simple Procedure for the Determination of the Quadrupole Interaction Parameters and Isotropic Chemical Shifts from MAS NMR Spectra of Half-integer Spins in Solids, Magn. Reson. Chem. 29 (1991) 941-945. https://doi.org/10.1002/mrc.1260290914.

[180] J.S. Wu, J.F. Stebbins, Effects of cation field strength on the structure of aluminoborosilicate glasses: High-resolution B-11, Al-27 and Na-23 MAS NMR, Journal of Non-Crystalline Solids 355 (2009) 556-562. https://doi.org/10.1016/j.jnoncrysol.2009.01.025.

[181] F. Angeli, O. Villain, S. Schuller, S. Ispas, T. Charpentier, Insight into Sodium Silicate Glass Structural Organization by Multinuclear NMR Combined with First-principles Calculations, Geochim. Cosmochim. Acta 75 (2011) 2453-2469. https://doi.org/10.1016/j.gca.2011.02.003.

[182] E. Gambuzzi, T. Charpentier, M.C. Menziani, A. Pedone, Computational Interpretation of ^{23}Na MQMAS NMR Spectra: A Comprehensive Investigation of the Na Environment in Silicate Glasses, Chem. Phys. Lett. 612 (2014) 56-61. https://doi.org/10.1016/j.cplett.2014.08.004.

[183] B.L. Sherriff, B. Zhou, Si-29 and Na-23 MAS NMR Spectroscopic Study of the Polytypes of the Titanosilicate Penkvilksite, Can. Mineral. 42 (2004) 1027-1035. https://doi.org/10.2113/gscanmin.42.4.1027.

[184] C.H. Liao, P.C. Chang, H.M. Kao, K.H. Lii, Synthesis, Crystal Structure, and Solid-state NMR Spectroscopy of a Salt-inclusion Stannosilicate: $Na_3F\ SnSi_3O_9$, Inorg. Chem. 44 (2005) 9335-9339. https://doi.org/10.1021/ic0514086.

[185] G.A.H. Tijink, R. Janssen, W.S. Veeman, Investigation of the Hydration of Zeolite NaA by Two-Dimensional 23Na Nutation NMR, J. Am. Chem. Soc. 109 (1987) 7301-7304. https://doi.org/10.1021/ja00258a009.

[186] S. Caldarelli, A. Buchholz, M. Hunger, Investigation of Sodium Cations in Dehydrated Zeolites LSX, X, and Y by ^{23}Na Off-resonance RIACT Triple-quantum and High-speed MAS NMR Spectroscopy, J. Am. Chem. Soc. 123 (2001) 7118-7123. https://doi.org/10.1021/ja0102538.

[187] M. Feuerstein, G. Engelhardt, P.L. McDaniel, J.E. MacDougall, T.R. Gaffney, Solid-state NMR Investigation of Cation Siting in LiNaLSX Zeolites, Microporous Mater. 16 (1998) 27-35. https://doi.org/10.1016/S1387-1811(98)00211-X.

[188] M. Feuerstein, M. Hunger, G. Engelhardt, J. Amoureux, Characterisation of Sodium Cations in Dehydrated Zeolite NaX by ^{23}Na NMR Spectroscopy, Solid State Nucl. Magn. Reson. 7 (1996) 95-103. https://doi.org/10.1016/S0926-2040(96)01246-5.

[189] K.H. Lim, C.P. Grey, Characterization of Extra-framework Cation Positions in Zeolites NaX and NaY with Very Fast ^{23}Na MAS and Multiple Quantum MAS NMR Spectroscopy, J. Am. Chem. Soc. 122 (2000) 9768-9780. https://doi.org/10.1021/ja001281d.

[190] M. Hunger, P. Sarv, A. Samoson, Two-Dimensional Triple-quantum ^{23}Na MAS NMR Spectroscopy of Sodium Cations in Dehydrated Zeolites, Solid State Nucl. Magn. Reson. 9 (1997) 115-120. https://doi.org/10.1016/S0926-2040(97)00051-9.

[191] L. Gueudré, A.A. Quoineaud, G. Pirngruber, P. Leflaive, Evidence of Multiple Cation Site Occupation in Zeolite NaY with High Si/Al Ratio, J. Phys. Chem. C 112 (2008) 10899-10908. https://doi.org/10.1021/jp803037u.

[192] H.A.M. Verhulst, W.J.J. Welters, G. Vorbeck, L.J.M. Vandeven, V.H.J. Debeer, R.A. Vansanten, J.W. Dehaan, New Assignment of the Signals in ^{23}Na DOR NMR to Sodium Sites in Dehydrated NaY Zeolite, J. Phys. Chem. 98 (1994) 7056-7062. https://doi.org/10.1021/j100079a027.

[193] L.J. Smith, H. Eckert, A.K. Cheetham, Potassium Cation Effects on Site Preferences in the Mixed Cation Zeolite Li,Na-chabazite, Chem. Mater. 13 (2001) 385-391. https://doi.org/10.1021/cm0006392.

[194] B.H. Fan, W.N. Zhang, P. Gao, G.J. Hou, R.S. Liu, S.T. Xu, Y.X. Wei, Z.M. Liu, Quantitatively Mapping the Distribution of Intrinsic Acid Sites in Mordenite Zeolite by High-Field ^{23}Na Solid-State Nuclear Magnetic Resonance, J. Phys. Chem. Lett. 13 (2022) 5186-5194. https://doi.org/10.1021/acs.jpclett.2c00932.

[195] P. Klein, J. Dedecek, H.M. Thomas, S.R. Whittleton, J. Klimes, J. Brus, L. Kobera, D.L. Bryce, S. Sklenak, NMR Crystallography of Monovalent Cations in Inorganic Matrices: Na^+ Siting and the Local Structure of Na^+ Sites in Ferrierites, J. Phys. Chem. C 126 (2022) 10686-10702. https://doi.org/10.1021/acs.jpcc.2c02496.

[196] Z.C. Zhao, Y.D. Xing, S.H. Li, X.J. Meng, F.S. Xiao, R. McGuire, A.N. Parvulescu, U. Muller, W.P. Zhang, Mapping Al Distributions in SSZ-13 Zeolites from ^{23}Na Solid-State NMR Spectroscopy and DFT Calculations, J. Phys. Chem. C 122 (2018) 9973-9979. https://doi.org/10.1021/acs.jpcc.8b01423.

[197] M. Paczwa, A.A. Sapiga, M. Olszewski, N. Sergeev, A.V. Sapiga, ^{23}Na Nuclear Magnetic Resonance Study of the Structure and Dynamic of Natrolite, Z. Naturforsch., A: Phys. Sci. 70 (2015) 295-300. https://doi.org/10.1515/zna-2014-0371.

[198] A.M. George, J.F. Stebbins, High-temperature ^{23}Na MAS NMR Data for Albite: Comparison to Chemical-shift Models, Am. Mineral. 80 (1995) 878-884. https://doi.org/10.2138/am-1995-9-1002.

[199] R. Jelinek, S. Özkar, G.A. Ozin, Extraframework Sodium Cation Sites in Sodium Zeolite Y Probed by ^{23}Na Double-rotation NMR, J. Am. Chem. Soc. 114 (1992) 4907-4908. https://doi.org/10.1021/ja00038a068.

[200] J.C. Buhl, M.M. Murshed, $(Na_4BH_4)^{(3+)}$ Guests inside Aluminosilicate, Gallosilicate and Aluminogermanate Sodalite Host Frameworks Studied by ^{1}H, ^{11}B, and ^{23}Na MAS NMR Spectroscopy, Mater. Res. Bull. 44 (2009) 1581-1585. https://doi.org/10.1016/j.materresbull.2009.01.023.

[201] F. Behrends, H. Eckert, Mixed-Alkali Effects in Aluminophosphate Glasses: A Re-examination of the System $[xNa_2O(1\text{-}x)Li_2O]_{0.46}[yAl_2O_3(1\text{-}y)P_2O_5]_{0.54}$, J. Phys. Chem. C 115 (2011) 17175-17183. https://doi.org/10.1021/jp201628f.

[202] R. Tabeta, H. Saito, ^{23}Na Chemical Shifts of Some Inorganic and Organic Compounds in the Solid State as Determined by Magic Angle Spinning and High Power NMR Methods, Chem. Lett. (1984) 293-296. https://doi.org/10.1246/cl.1984.293.

[203] C. Johnson, E.A. Moore, M. Mortimer, An Assignment of the Na-23 MAS NMR Spectrum of $Na_5P_3O_{10} \cdot H_2O$ Using a General *ab initio* Method, Chem. Comm. (2000) 791-792. https://doi.org/10.1039/b001724h.

[204] C. Johnson, E.A. Moore, M. Mortimer, Periodic *ab initio* Calculation of Nuclear Quadrupole Parameters as an Assignment Tool in Solid-state NMR Spectroscopy: Applications to Na-23 NMR Spectra of Crystalline Materials, Solid State Nucl. Magn. Reson. 27 (2005) 155-164. https://doi.org/10.1016/j.ssnmr.2004.08.005.

[205] F.A. Perras, I. Korobkov, D.L. Bryce, NMR crystallography of sodium diphosphates: combining dipolar, shielding, quadrupolar, diffraction, and computational information, Crystengcomm 15 (2013) 8727-8738. https://doi.org/10.1039/c3ce40875b.

[206] K.H. Lim, C.P. Grey, Analysis of the Anisotropic Dimension in the RIACT (II) Multiple Quantum MAS NMR Experiment for *I* = 3/2 Nuclei, Solid State Nucl. Magn. Reson. 13 (1998) 101-112. https://doi.org/10.1016/S0926-2040(98)00070-8.

[207] I. Abrahams, G.E. Hawkes, A. Ahmed, K. Franks, J.C. Knowles, P.R. Bodart, T. Nunes, Structure of Calcium Tetrasodium Bis-cyclotriphosphate $CaNa_4(P_3O_9)_2$ by X-ray Diffraction and Solid-state NMR, J. Chem. Soc., Dalton Trans. (2002) 1800-1805. https://doi.org/10.1039/b109036b.

[208] I. Abrahams, A. Ahmed, C.J. Groombridge, G.E. Hawkes, T.G. Nunes, Cation Distribution in Cubic $NaM(PO_3)_3$ (M = Mg or Zn) Using X-ray Powder Diffraction and Solid State NMR, J. Chem. Soc.-Dalton Trans. (2000) 155-160. https://doi.org/10.1039/a906413c.

[209] I. Abrahams, G.E. Hawkes, A. Ahmed, T. Di Cristina, D.Z. Demetriou, G.I. Ivanova, Structures of the Chain Metaphosphates $NaM(PO_3)_3$ (M = Ca or Sr), Magn. Reson. Chem. 46 (2008) 316-322. https://doi.org/10.1002/mrc.2161.

[210] C.C. de Araujo, W. Strojek, L. Zhang, H. Eckert, G. Poirier, S.J.L. Ribeiro, Y. Messaddeq, Structural Studies of $NaPO_3$-WO_3 Glasses by Solid State NMR and Raman Spectroscopy, J. Mater. Chem. 16 (2006) 3277-3284. https://doi.org/10.1039/b605971f.

[211] J. Tsuchida, J. Schneider, R.R. Deshpande, H. Eckert, Cation Distribution and Local Order in Mixed Sodium Metaphosphate Glasses, J. Phys. Chem. C 116 (2012) 24449-24461. https://doi.org/10.1021/jp308268h.

[212] J.J. Ren, H. Eckert, Quantification of Short and Medium Range Order in Mixed Network Former Glasses of the System GeO_2-$NaPO_3$: A Combined NMR and X-ray Photoelectron Spectroscopy Study, Journal of Physical Chemistry C 116 (2012) 12747-12763. https://doi.org/10.1021/jp301383x.

[213] F. Behrends, H. Eckert, Mixed Network Former Effects in Oxide Glasses: Spectroscopic Studies in the System $M_2O_{1/3}$ $[(Ge_2O_4)_x(P_2O_5)_{1-x}]_{2/3}$, J. Phys. Chem. C 118 (2014) 10271-10283. https://doi.org/10.1021/jp5013285.

[214] S.H. Santagneli, C.C. de Araujo, W. Strojek, H. Eckert, G. Poirier, S.J.L. Ribeiro, Y. Messaddeq, Structural Studies of $NaPO_3$-MoO_3 Glasses by Solid-state Nuclear Magnetic Resonance and Raman Spectroscopy, J. Phys. Chem. B 111 (2007) 10109-10117. https://doi.org/10.1021/jp072883n.

[215] H. Bradtmüller, A.M. Nieto-Munoz, J.F. Ortiz-Mosquera, A.C.M. Rodrigues, H. Eckert, Glass-to-Crystal Transition in the NASICON Glass-Ceramic System $Na_{1+x}Al_xM_{2-x}(PO_4)_3$ (M = Ge, Ti), J. Non-Cryst. Solids 489 (2018) 91-101. https://doi.org/10.1016/j.jnoncrysol.2017.10.057.

[216] P. Maldonado-Manso, M.A.G. Aranda, S. Bruque, J. Sanz, E.R. Losilla, Nominal vs. Actual Stoichiometries in Al-doped NASICONs: A Study of the $Na_{1.4}Al_{0.4}M_{1.6}(PO_4)_3$ (M=Ge, Sn, Ti, Hf, Zr)Family, Solid State Ionics 176 (2005) 1613-1625. https://doi.org/10.1016/j.ssi.2005.04.009.

[217] S. Quillard, M. Paris, P. Deniard, R. Gildenhaar, G. Berger, L. Obadia, J.M. Bouler, Structural and Spectroscopic Characterization of a Series of Potassium- and/or Sodium-substituted β-tricalcium Phosphate, Acta Biomater. 7 (2011) 1844-1852. https://doi.org/10.1016/j.actbio.2010.12.016.

[218] N.J. Clayden, L. Pugh, Characterization of $NaSn_2(PO_4)_3$ by Solid-state Nuclear Magnetic Resonance Spectroscopy, J. Mater. Sci. Lett. 17 (1998) 1563-1565. https://doi.org/10.1023/a:1006578718711.

[219] K. Trad, D. Carlier, L. Croguennec, M. Wattiaux, B. Lajmi, M. Ben Amara, C. Delmas, A Layered Iron(III) Phosphate Phase, $Na_3Fe_3(PO_4)_4$: Synthesis, Structure, and Electrochemical Properties as Positive Electrode in Sodium Batteries, J. Phys. Chem. C 114 (2010) 10034-10044. https://doi.org/10.1021/jp100751b.

[220] A.T. Grigg, M. Mee, P.M. Mallinson, S.K. Fong, Z.H. Gan, R. Dupree, D. Holland, Cation Substitution in β-Tricalcium Phosphate Investigated Using Multi-nuclear, Solid-state NMR, J. Solid State Chem. 212 (2014) 227-236. https://doi.org/10.1016/j.jssc.2013.10.026.

[221] H. Chen, Q. Hao, O. Zivkovic, G. Hautier, L.-S. Du, Y. Tang, Y.-Y. Hu, X. Ma, C.P. Grey, G. Ceder, Sidorenkite ($Na_3MnPO_4CO_3$): A New Intercalation Cathode Material for Na-Ion Batteries, Chem. Mater. 25 (2013) 2777-2786. https://doi.org/10.1021/cm400805q.

[222] J. Skibsted, M. Brorson, J. Villadsen, H.J. Jakobsen, Characterization of a New Hexasodium Diphosphopentamolybdate Hydrate, $Na_6P_2Mo_5O_{23}·7H_2O$, by Na-23 MQMAS NMR Spectroscopy and X-ray Powder Diffraction, Inorg. Chem. 39 (2000) 4130-4136. https://doi.org/10.1021/ic000309j.

[223] S.F. Dec, A.M. Herring, Structure and Dynamics of Disodium Hydrogen 12-tungstophosphoric Acid, J. Phys. Chem. B 108 (2004) 12339-12351. https://doi.org/10.1021/jp038044s.

[224] M. Nyman, A.J. Celestian, J.B. Parise, G.P. Holland, T.M. Alam, Solid-state Structural Characterization of a Rigid Framework of Lacunary Heteropolyniobates, Inorg. Chem. 45 (2006) 1043-1052. https://doi.org/10.1021/ic051155g.

[225] W. Strojek, C.M. Felise, H. Eckert, B. Ewald, R. Kniep, Site Discrimination in the Crystalline Borophosphate $Na_5B_2P_3O_{13}$ Using Advanced Solid-state NMR Techniques, Solid State Nucl. Magn. Reson. 32 (2007) 89-98. https://doi.org/10.1016/j.ssnmr.2007.09.002.

[226] J.L. Wang, S. Sen, P. Yu, N.D. Browning, S.M. Kauzlarich, Synthesis and Spectroscopic Characterization of P-doped Na_4Si_4, J. Solid State Chem. 183 (2010) 2522-2527. https://doi.org/10.1016/j.jssc.2010.07.051.

[227] O. Pecher, M. Esters, A. Gorne, B. Mausolf, A. Ormeci, F. Haarmann, The Zintl Phase Cs_7NaSi_8 - From NMR Signal Line Shape Analysis and Quantum Mechanical Calculations to Chemical Bonding, Z. Anorg. Allg. Chem. 640 (2014) 2169-2176. https://doi.org/10.1002/zaac.201400194.

[228] G. Klösters, M. Jansen, Determination of the (Na+) Sternheimer Antishielding Factor by Na-23 NMR Spectroscopy on Sodium Oxide Chloride, Na_3OCl, Solid State Nucl. Magn. Reson. 16 (2000) 279-283. https://doi.org/10.1016/S0926-2040(00)00079-5.

[229] T.R. Krawietz, D.K. Murray, J.F. Haw, Alkali Metal Oxides, Peroxides, and Superoxides: A Multinuclear MAS NMR Study, J. Phys. Chem. A 102 (1998) 8779-8785. https://doi.org/10.1021/jp9823190.

[230] S.F. Dec, G.E. Maciel, J.J. Fitzgerald, Solid-State ^{23}Na and ^{27}Al MAS NMR Study of the Dehydration of $NA_2O{\cdot}AL_2O_3{\cdot}3H_2O$, J. Am. Chem. Soc. 112 (1990) 9069-9077. https://doi.org/10.1021/ja00181a006.

[231] T.J. Bastow, M.E. Hobday, M.E. Smith, H.J. Whitfield, Structural Characterisation of Na_2ZrO_3, Solid State Nucl. Magn. Reson. 3 (1994) 49-57. https://doi.org/10.1016/0926-2040(94)90023-X.

[232] T.J. Bastow, M.E. Hobday, M.E. Smith, H.J. Whitfield, Solid State NMR Characterisation of Crystalline Na_2O-ZrO_2-SiO_2 Phases, Solid State Nucl. Magn. Reson. 5 (1996) 293-303. https://doi.org/10.1016/0926-2040(95)01198-6.

[233] D. Böhnisch, S. Seidel, C. Benndorf, T. Jansen, L. Funke, R.D. Hoffmann, L. Heletta, J. Stahl, D. Johrendt, H. Eckert, T. Justel, R. Potgen, Na3GaF6 - A Crystal Chemical and Solid State NMR Spectroscopic Study, Z. Krist.-Cryst. Mater. 233 (2018) 479-487. https://doi.org/10.1515/zkri-2017-2138.

[234] G. Mali, M.U.M. Patel, M. Mazaj, R. Dominko, Stable Crystalline Forms of Na Polysulfides: Experiment versus Ab Initio Computational Prediction, Chem. Eur. J. 22 (2016) 3355-3360. https://doi.org/10.1002/chem.201504242.

[235] J. Skibsted, N.C. Nielsen, H. Bildsoe, H.J. Jakobsen, Magnitudes and relative orientation of vanadium-51 quadrupole coupling and anisotropic shielding tensors in metavanadates and potassium vanadium oxide (KV3O8) from vanadium-51 MAS NMR spectra. Sodium-23 quadrupole coupling parameters for .alpha.- and .beta.-NaVO3, J. Am. Chem. Soc. 115 (1993) 7351-7362. https://doi.org/10.1021/ja00069a038.

[236] S.M. Bradley, J.V. Hanna, ^{27}Al and ^{23}Na MAS NMR and Powder X-ray Diffraction Studies of Sodium Aluminate Speciation and the Mechanistics of Aluminum Hydroxide Precipitation upon Acid Hydrolysis, J. Am. Chem. Soc. 116 (1994) 7771-7783. https://doi.org/10.1021/ja00096a038.

[237] B. Albert, K. Hofmann, C. Fild, H. Eckert, M. Schleifer, R. Gruehn, "NaB_{15}": A New Structural Description Based on X-ray and Neutron Diffraction, Electron Microscopy, and Solid-state NMR Spectroscopy, Chem. Eur. J. 6 (2000) 2531-2536. https://doi.org/10.1002/1521-3765(20000717)6:14.

[238] A.M. George, S. Sen, J.F. Stebbins, ^{23}Na Chemical Shifts and Local Structure in Crystalline, Glassy, and Molten Sodium Borates and Germanates, Solid State Nucl. Magn. Reson. 10 (1997) 9-17. https://doi.org/10.1016/s0926-2040(97)00072-6.

[239] J.D. Cuthbert, H.E. Petch, NMR Studies of Hydrated Sodium Tetraborate Minerals. 2. Na-23 Sites in Borax and Tincalconite, J. Chem. Phys. 39 (1963) 1247-&. https://doi.org/10.1063/1.1734423.

[240] B. Zhou, V.K. Michaelis, S. Kroeker, J.E.C. Wren, Y.F. Yao, B.L. Sherriff, Y.M. Pan, ^{11}B and ^{23}Na Solid-state NMR and Density Functional Theory Studies of Electric Field Gradients at Boron Sites in Ulexite, Crystengcomm 15 (2013) 8739-8747. https://doi.org/10.1039/c3ce41251b.

[241] T. Iijima, T. Yamase, K. Nishimura, Molecular and Electron-Spin Structures of a Ring-Shaped Mixed-Valence Polyoxovanadate (IV, V) Studied by ^{11}B and ^{23}Na Solid-State NMR Spectroscopy and DFT Calculations, Solid State Nucl. Magn. Reson. 76-77 (2016) 15-23. https://doi.org/10.1016/j.ssnmr.2016.03.004.

[242] S.L. Tagg, J.C. Huffman, J.W. Zwanziger, Crystal Structure and Sodium Environments in Sodium Tetratellurite, $Na_2Te_4O_9$, and Sodium Tellurite, Na_2TeO_3, by X-ray Crystallography and Sodium-23 NMR, Chem. Mater. 6 (1994) 1884-1889. https://doi.org/10.1021/cm00046a052.

[243] K.E. Johnston, C.C. Tang, J.E. Parker, K.S. Knight, P. Lightfoot, S.E. Ashbrook, The Polar Phase of $NaNbO_3$: A Combined Study by Powder Diffraction, Solid-State NMR, and First-Principles Calculations, J. Am. Chem. Soc. 132 (2010) 8732-8746. https://doi.org/10.1021/ja101860r.

[244] S.E. Ashbrook, L. Le Polles, R. Gautier, C.J. Pickard, R.I. Walton, Na-23 Multiple-quantum MAS NMR of the Perovskites $NaNbO_3$ and $NaTaO_3$, Phys. Chem. Chem. Phys. 8 (2006) 3423-3431. https://doi.org/10.1039/b604520k.

[245] M.D. Peel, S.E. Ashbrook, P. Lightfoot, Unusual Phase Behavior in the Piezoelectric Perovskite System, $Li_xNa_{1-x}NbO_3$, Inorg. Chem. 52 (2013) 8872-8880. https://doi.org/10.1021/ic401061.

[246] A. Kuhn, M.T. Azcondo, U. Amador, K. Boulahya, I. Sobrados, J. Sanz, F. Garcia-Alvarado, Structural Characterization and NMR Study of $NaNbWO_6$ and its Proton-exchanged Derivatives, Inorg. Chem. 46 (2007) 5390-5397. https://doi.org/10.1021/ic0701312.

[247] H.J. Jakobsen, H. Bildsoe, M. Beekman, S. Stefanoski, G.S. Nolas, C.R. Bowers, Low-Temperature ^{23}Na MAS NMR Reveals Dynamic Effects and Compositions for the Large and Small Channels in the Zeolite-Like Ge-Framework of $Na_{1-x}Ge_{3+z}$ Materials, J. Phys. Chem. C 118 (2014) 28890-28897. https://doi.org/10.1021/jp509978j.

[248] L.M. Peng, J.F. Stebbins, Sodium Germanate Glasses and Crystals: NMR Constraints on Variation in Structure with Composition, J. Non-Cryst. Solids 353 (2007) 4732-4742. https://doi.org/10.1016/j.jnoncrysol.2007.06.066.

[249] L.S. Du, J.F. Stebbins, Oxygen Sites and Network Coordination in Sodium Germanate Glasses and Crystals: High-Resolution Oxygen-17 and Sodium-23 NMR, J. Phys. Chem. B 110 (2006) 12427-12437. https://doi.org/10.1021/jp0615510.

[250] J. Skibsted, H.J. Jakobsen, ^{23}Na Magic-angle Spinning NMR of Central and Satellite Transitions in the Characterization of the Anhydrous, Dihydrate, and Mixed Phases of Sodium Molybdate and Tungstate, Solid State Nucl. Magn. Reson. 3 (1994) 29-38. https://doi.org/10.1016/0926-2040(94)90049-3.

[251] A.L. Smith, P.E. Raison, L. Martel, D. Prieur, T. Charpentier, G. Wallez, E. Suard, A.C. Scheinost, C. Hennig, P. Martin, K.O. Kvashnina, A.K. Cheetham, R.J.M. Konings, A New Look at the Structural Properties of Trisodium Uranate Na_3UO_4, Inorg. Chem. 54 (2015) 3552-3561. https://doi.org/10.1021/acs.inorgchem.5b00136.

[252] A.L. Smith, P.E. Raison, L. Martel, T. Charpentier, I. Farnan, D. Prieur, C. Hennig, A.C. Scheinost, R.J.M. Konings, A.K. Cheetham, A Na-23 Magic Angle Spinning Nuclear Magnetic Resonance, XANES, and High-Temperature X-ray Diffraction Study of $NaUO_3$, Na_4UO_5, and $Na_2U_2O_7$, Inorg. Chem. 53 (2014) 375-382. https://doi.org/10.1021/ic402306c.

[253] V. Luca, C.S. Griffith, J.V. Hanna, Microcrystalline Hexagonal Tungsten Bronze. 2. Dehydration Dynamics, Inorg. Chem. 48 (2009) 5663-5676. https://doi.org/10.1021/ic801295c.

[254] D. Larink, H. Eckert, S.W. Martin, Structure and Ionic Conductivity in the Mixed-Network Former Chalcogenide Glass System $[Na_2S]_{2/3}[(B_2S_3)_x(P_2S_5)_{1-x}]_{1/3}$, J. Phys. Chem. C 116 (2012) 22698-22710. https://doi.org/10.1021/jp3068365.

[255] R. Siegel, J. Hirschinger, D. Carlier, M. Menetrier, C. Delmas, Co-59, Na-23 NMR and Electric Field Gradient Calculations in the Layered Cobalt Oxides $NaCoO_2$ and $HCoO_2$, Solid State Nucl. Magn. Reson. 23 (2003) 243-262. https://doi.org/10.1016/s0926-2040(03)00017-1.

[256] S.H. Xin, Q. Wang, J. Xu, N.D. Feng, W.Z. Li, F. Deng, Heteronuclear Correlation experiments of ^{23}Na-^{27}Al in Rotating Solids, Solid State Nucl. Magn. Reson. 84 (2017) 103-110. https://doi.org/10.1016/j.ssnmr.2017.01.002.

[257] R.W. Schurko, M.J. Willans, B. Skadtchenko, D.M. Antonelli, Solid-state Na-23 and C-13 NMR Characterization of Na_3C_{60}, J. Solid State Chem. 177 (2004) 2255-2264. https://doi.org/10.1016/j.jssc.2004.02.029.

[258] G. Wu, Oxygen-17 NMR Studies of Organic and Biological Molecules, in: R.E. Wasylishen, S.E. Ashbrook, S. Wimperis (Eds.), NMR of Quadrupolar Nuclei in Solid Materials, Wiley, Chichester, 2012, pp. 273-290.

[259] E.N. Bassey, H. Nguyen, T. Insinna, J. Lee, A.L. Barra, G. Cibin, P. Bencok, R.J. Clement, C.P. Grey, Strong Magnetic Exchange Interactions and Delocalized Mn-O States Enable High-Voltage Capacity in the Na-Ion Cathode P2-Na_{0.67} Mg_{0.28}Mn_{0.72} O₂, Chem. Mater. 36 (2024) 9493-9515. https://doi.org/10.1021/acs.chemmater.4c01320.

[260] E.N. Bassey, P.J. Reeves, I.D. Seymour, C.P. Grey, ^{17}O NMR Spectroscopy in Lithium-Ion Battery Cathode Materials: Challenges and Interpretation, J. Am. Chem. Soc. 144 (2022) 18714-18729. https://doi.org/10.1021/jacs.2c02927.

[261] S.E. Ashbrook, Z.H. Davis, R.E. Morris, C.M. Rice, ^{17}O NMR spectroscopy of crystalline microporous materials, Chemical Science 12 (2021) 5016-5036. https://doi.org/10.1039/d1sc00552a.

[262] S.E. Ashbrook, M.E. Smith, Oxygen-17 NMR of Inorganic Materials, in: R.E. Wasylishen, S.E. Ashbrook, S. Wimperis (Eds.), NMR of Quadrupolar Nuclei in Solid Materials, Wiley, Chichester, 2012, pp. 291-320.

[263] I.P. Gerothanassis, Oxygen-17 NMR Spectroscopy: Basic Principles and Applications (Part II), Progr. Nucl. Magn. Reson. Spectr. 57 (2010) 1-110. https://doi.org/10.1016/j.pnmrs.2009.12.001.

[264] D. Carnevale, G. Mouchaham, S.J. Wang, M. Baudin, C. Serre, G. Bodenhausen, D. Abergel, Natural abundance oxygen-17 solid-state NMR of metal organic frameworks enhanced by dynamic nuclear polarization, Phys. Chem. Chem. Phys. 23 (2021) 2245-2251. https://doi.org/10.1039/d0cp06064j.

[265] U. Pingel, ^{17}O NMR -Spektroskopie von Porösen Materialien, PhD thesis, Universität Leipzig, Leipzig, 2000.

[266] T.H. Walter, E. Oldfield, Magic-angle Spinning ^{17}O NMR of Aluminum Oxides and Hydroxides, J. Phys. Chem. 93 (1989) 6744-6751.

[267] T.J. Bastow, S.N. Stuart, ^{17}O NMR in Simple Oxides, Chem. Phys. Lett. 143 (1990) 459-467. https://doi.org/http://dx.doi.org/10.1016/0301-0104(90)87025-7.

[268] H. Nagashima, F. Maleki, J. Trebosc, R. Belgamwar, V. Polshettiwar, M. Kahn, Y. Kon, G. Pacchioni, O. Lafon, J.P. Amoureux, Probing the Surface of Oxide Nanoparticles Using DNP-Enhanced High-Resolution NMR of Quadrupolar Nuclei, J. Phys. Chem. Lett. 15 (2024) 4858-4863. https://doi.org/10.1021/acs.jpclett.4c00563.

[269] W.Z. Li, Q. Wang, J. Xu, F. Aussenac, G.D. Qi, X.L. Zhao, P. Gao, C. Wang, F. Deng, Probing the Surface of γ-Al_2O_3 by Oxygen-17 Dynamic Nuclear Polarization Enhanced Solid-State NMR Spectroscopy, Phys. Chem. Chem. Phys. 20 (2018) 17218-17225. https://doi.org/10.1039/c8cp03132k.

[270] Q. Wang, W.Z. Li, I. Hung, F. Mentink-Vigier, X.L. Wang, G.D. Qi, X. Wang, Z.H. Gan, J. Xu, F. Deng, Mapping the oxygen structure of γ-Al_2O_3 by high-field solid-state NMR spectroscopy, Nat. Commun. 11 (2020). https://doi.org/10.1038/s41467-020-17470-4.

[271] M. Mais, S. Paul, N.S. Barrow, J.J. Titman, Dynamic Nuclear Polarisation Enhanced Solid-State Nuclear Magnetic Resonance Studies of Surface Modification of γ-Alumina, Johnson Matthey Tech. 62 (2018) 271-278. https://doi.org/10.1595/205651318x696765.

[272] A.R. Thompson, A.C. Kunwar, H.S. Gutowsky, E. Oldfield, ^{17}O and ^{27}Al NMR Spectroscopic Investigatioons of Aluminum (III) Hydrolysis Products, J. Chem. Soc. Dalton Trans. (1987) 2317-2322. https://doi.org/10.1039/DT9870002317.

[273] J.F. Stebbins, S.K. Lee, J.V. Oglesby, Al-O-Al Oxygen Sites in Crystalline Aluminates and Aluminosilicate Glasses: High-resolution Oxygen-17 NMR Results, Am. Mineral. 84 (1999) 983-986. https://doi.org/10.2138/am-1999-5-635.

[274] J.F. Stebbins, J.V. Oglesby, S. Kroeker, Oxygen Triclusters in Crystalline $CaAl_4O_7$ (Grossite) and in Calcium Aluminosilicate Glasses: ^{17}O NMR, Am. Mineral. 86 (2001) 1307-1311. https://doi.org/10.2138/am-2001-1019.

[275] T.J. Bastow, P.J. Dirken, M.E. Smith, H.J. Whitfield, Factors Controlling the ^{17}O NMR Chemical Shift in Ionic Mixed Metal Oxides, J. Phys. Chem. 100 (1996) 18539-18545. https://doi.org/10.1021/jp9622694.

[276] L. Bull, A. Cheetham, T. Anupold, A. Reinhold, A. Samoson, J. Sauer, B. Bussemer, Y. Lee, S. Gann, J. Shore, A. Pines, R. Dupree, A High-resolution ^{17}O NMR Study of Siliceous Zeolite Faujasite, J. Am. Chem. Soc. 120 (1998) 3510-3511. https://doi.org/10.1021/ja9743001.

[277] L.M. Bull, B. Bussemer, T. Anupold, A. Reinhold, A. Samoson, J. Sauer, A.K. Cheetham, R. Dupree, A High-resolution ^{17}O and ^{29}Si NMR Study of Zeolite Siliceous Ferrierite and ab Initio Calculations of NMR Parameters, J. Am. Chem. Soc. 122 (2000) 4948-4958. https://doi.org/10.1021/ja993339y.

[278] H.K.C. Timken, G.L. Turner, J.P. Gilson, L.B. Welsh, E. Oldfield, Solid-state ^{17}O NMR Spectroscopic Studies of Zeolites and Related Systems. Part 1, J. Am. Chem. Soc. 108 (1986) 7231-7235. https://doi.org/10.1021/ja00283a017.

[279] D.R. Spearing, I. Farnan, J.F. Stebbins, Dynamics of the α–β Phase Transitions in Quartz and Cristobalite as Observed by In Situ High-temperature ^{29}Si NMR and ^{17}O NMR, Phys. Chem. Mineral. 19 (1992) 307-321. https://doi.org/10.1007/BF00204008.

[280] F.H. Larsen, I. Farnan, ^{29}Si and ^{17}O (Q)CPMG-MAS Solid-state NMR Experiments as an Optimum Approach for Half-integer Nuclei Having Long T_1 Relaxation Times, Chem. Phys. Lett. 357 (2002) 403-408. https://doi.org/10.1016/S0009-2614(02)00520-1.

[281] T.H. Walter, G.L. Turner, E. Oldfield, ^{17}O Cross-polarization NMR Spectroscopy of Inorganic Solids, J. Magn. Reson. 76 (1988) 106-120. https://doi.org/10.1021/j100355a034.

[282] X. Cong, R.J. Kirkpatrick, ^{17}O MAS NMR Investigation of the Structure of Calcium Silicate Hydrate Gel, J. Am. Ceram. Soc. 79 (1996) 1585-1592. https://doi.org/10.1111/j.1151-2916.1996.tb08768.x.

[283] X. Xue, J.F. Stebbins, M. Kanzaki, Correlations between ^{17}O NMR Parameters and Local Structure Around Oxygen in High-pressure Silicates: Implications for the Structure of Silicate Melts at High Pressure, Am. Mineral. 79 (1994) 31-42.

[284] P.J. Grandinetti, J.H. Baltisberger, I. Farnan, J.F. Stebbins, U. Werner, A. Pines, Solid-State ^{17}O Magic-angle and Dynamic-angle Spinning NMR Study of the SiO_2 Polymorph Coesite, J. Phys. Chem. 99 (1995) 12341-12348. https://doi.org/10.1021/j100032a045.

[285] T.M. Clark, P.J. Grandinetti, P. Florian, J.F. Stebbins, Correlated Structural Distributions in Silica Glass, Phys. Rev. B 70 (2004). https://doi.org/10.1103/PhysRevB.70.064202.

[286] S.E. Ashbrook, A.J. Berry, S. Wimperis, ^{17}O Multiple-quantum MAS NMR Study of High-pressure Hydrous Magnesium Silicates, J. Am. Chem. Soc. 123 (2001) 6360-6366. https://doi.org/10.1021/ja004290v.

[287] S.E. Ashbrook, A.J. Berry, W.O. Hibberson, S. Steuernagel, S. Wimperis, High-resolution ^{17}O NMR Spectroscopy of Wadsleyite (β- Mg_2SiO_4), J. Am. Chem. Soc. 125 (2003) 11824-11825. https://doi.org/10.1021/ja036777k.

[288] J.M. Griffin, A.J. Berry, D.J. Frost, S. Wimperis, S.E. Ashbrook, Water in the Earth's Mantle: A Solid-state NMR Study of Hydrous Wadsleyite, Chem. Sci. 4 (2013) 1523-1538. https://doi.org/10.1039/c3sc21892a.

[289] S. Schramm, E. Oldfield, High-resolution ^{17}O NMR of Solids, J. Am. Chem. Soc. 106 (1984) 2502-2506. https://doi.org/10.1021/ja00321a002.

[290] K.T. Mueller, J.H. Baltisberger, E.W. Woote, A. Pines, Isotropic Chemical Shifts and Quadrupolar Parameters for ^{17}O Using Dynamic Angle Spinning NMR, J. Phys. Chem. 96 (1992) 7001-7004. https://doi.org/10.1021/j100196a028.

[291] S.E. Ashbrook, A.J. Berry, S. Wimperis, Three- and Five-quantum ^{17}O MAS NMR of Forsterite Mg_2SiO_4, Am. Mineral. 1999 84 (1999) 1191-1194.

[292] S.E. Ashbrook, A.J. Berry, S. Wimperis, ^{17}O Multiple-quantum MAS NMR Study of Pyroxenes, J. Phys. Chem. B. 106 (2002) 773-778. https://doi.org/10.1021/jp0130362.

[293] H.K.C. Timken, S.E. Schramm, R.J. Kirkpatrick, E. Oldfield, Solid-state ^{17}O NMR Spectroscopic Studies of Alkaline Earth Metasilicates, J. Phys. Chem. 91 (1987) 1054-1058. https://doi.org/10.1021/j100289a010.

[294] S.K. Lee, J.F. Stebbins, Nature of Cation Mixing and Ordering in Na-Ca Silicate Glasses and Melts, J. Phys. Chem. B 107 (2003) 3141-3148. https://doi.org/10.1021/jp027489y.

[295] H. Maekawa, P. Florian, D. Massiot, H. Kiyono, M. Nakamura, Effect of Alkali Metal Oxide on ^{17}O NMR Parameters and Si-O-Si Angles of Alkali Metal Disilicate, J. Phys. Chem. 100 (1996) 5525-5532. https://doi.org/10.1021/jp952258v.

[296] H. Maekawa, T. Saito, T. Yokokawa, Water in Silicate Glass: ^{17}O NMR of Hydrous Silica, Albite, and $Na_2Si_4O_9$ Glasses, J. Phys. Chem. B 102 (1998) 7523-7529. https://doi.org/10.1021/jp980662z.

[297] F. Angeli, T. Charpentier, M. Gaillard, P. Jollivet, Influence of Zirconium on the Structure of Pristine and Leached Soda-lime Borosilicate Glasses: Towards a Quantitative Approach by ^{17}O MQMAS NMR, J. Non-Cryst. Solids 354 (2008) 3713-3722. https://doi.org/10.1016/j.jnoncrysol.2008.03.046.

[298] U. Brenn, H. Ernst, D. Freude, R. Herrmann, R. Jahnig, H.G. Karge, J. Karger, T. Konig, B. Madler, U.T. Pingel, D. Prochnow, W. Schwieger, Synthesis and Characterization of the Layered Sodium Silicate Ilerite, Microporous Mesoporous Mater. 40 (2000) 43-52. https://doi.org/10.1016/S1387-1811(00)00241-9.

[299] J.V. Oglesby, S. Kroeker, J.F. Stebbins, Potassium Hydrogen Disilicate: A Possible Model Compound for ^{17}O NMR Spectra of Hydrous Silicate Glasses, Am. Mineral. 86 (2001) 341-347. https://doi.org/10.2138/am-2001-2-318.

[300] P.J. Dirken, M.E. Smith, H.J. Whitfield, ^{17}O and ^{29}Si Solid-state NMR Study of AtomicScale Structure in Sol-gel Prepared TiO_2-SiO_2-Materials, J. Phys. Chem. 99 (1995) 395-401. https://doi.org/10.1021/j100001a059.

[301] T.J. Bastow, G.A. Botton, J. Etheridge, M.E. Smith, H.J. Whitfield, A Study of $Li_2TiOSiO_4$ and $Li_2TiOGeO_4$ by X-ray Powder and Electron Single-crystal Diffraction, ^{17}O MAS NMR and O *K*-edge and Ti $L_{2,3}$-edge EELS, Acta Cryst. A 55 (1999) 127-132. https://doi.org/10.1107/s0108767398006990.

[302] H. Kiyono, Y. Matsuda, T. Shimada, M. Ando, I. Oikawa, H. Maekawa, S. Nakayama, S. Ohki, M. Tansho, T. Shimizu, P. Florian, D. Massiot, Oxygen-17 Nuclear Magnetic Resonance Measurements on Apatite-type Lanthanum Silicate ($La_{9.33}(SiO_4)_6O_2$), Solid State Ionics 228 (2012) 64-69. https://doi.org/10.1016/j.ssi.2012.09.016.

[303] P.M. Aguiar, V.K. Michaelis, C.M. McKinley, S. Kroeker, Network Connectivity in Cesium Borosilicate Glasses: ^{17}O Multiple-quantum MAS and Double-resonance NMR, J. Non-Cryst. Solids 363 (2013) 50-56. https://doi.org/10.1016/j.jnoncrysol.2012.12.010.

[304] L.S. Du, J.F. Stebbins, Nature of Silicon-boron Mixing in Sodium Borosilicate Glasses: A High-resolution ^{11}B and ^{17}O NMR Study, J. Phys. Chem. B 107 (2003) 10063-10076. https://doi.org/10.1021/jp034048l.

[305] P.D. Zhao, S. Kroeker, J.F. Stebbins, Non-bridging Oxygen Sites in Barium Borosilicate Glasses: Results from ^{11}B and ^{17}O NMR, J. Non-Cryst. Solids 276 (2000) 122-131. https://doi.org/10.1016/S0022-3093(00)00290-8.

[306] J.F. Stebbins, J.V. Oglesby, Z. Xu, Disorder Among Network-modifier Cations in Silicate Glasses - New Constraints from Triple-quantum ^{17}O NMR, Am. Mineral. 82 (1997) 1116-1124. https://doi.org/10.2138/am-1997-11-1209.

[307] S. Kroeker, D. Rice, J.F. Stebbins, Disordering During Melting: An O-17 NMR Study of Crystalline and Glassy $CaTiSiO_5$ (Titanite), Am. Mineral. 87 (2002) 572-579. https://doi.org/10.2138/am-2002-0422.

[308] S.K. Lee, E.J. Kim, Probing Metal-Bridging Oxygen and Configurational Disorder in Amorphous Lead Silicates: Insights from ^{17}O Solid-State Nuclear Magnetic Resonance, J. Phys. Chem. C 119 (2015) 748-756. https://doi.org/10.1021/jp509780f.

[309] P.S. Neuhoff, P. Shao, J.F. Stebbins, Effect of Extraframework Species on ^{17}O NMR Chemical Shifts in Zeolite A, Microporous Mesoporous Mater. 55 (2002) 239-251. https://doi.org/10.1016/S1387-1811(02)00413-4.

[310] U.T. Pingel, J.P. Amoureux, T. Anupold, F. Bauer, H. Ernst, C. Fernandez, D. Freude, A. Samoson, High-field ^{17}O NMR Studies of the SiOAl Bond in Solids, Chem. Phys. Lett. 194 (1998) 345-350. https://doi.org/10.1016/S0009-2614(98)00847-1

[311] D. Freude, T. Loeser, D. Michel, U. Pingel, D. Prochnow, ^{17}O NMR Studies of Low Silicate Zeolites, Solid State Nucl. Magn. Reson. 20 (2001) 46-60. https://doi.org/10.1006/snmr.2001.0029.

[312] P. Zhao, P.S. Neuhoff, J.F. Stebbins, Comparison of FAM Mixing to Single-pulse Mixing in ^{17}O 3Q- and 5Q-MAS NMR of Oxygen Sites in Zeolites, Chem. Phys. Lett. 344 (2001) 325-332. https://doi.org/10.1016/S0009-2614(01)00786-2.

[313] T. Loeser, D. Freude, G.T.P. Mabande, W. Schwieger, ^{17}O NMR Studies of Sodalites, Chem. Phys. Lett. 370 (2003) 32-38. https://doi.org/10.1016/S0009-2614(03)00066-6.

[314] D. Schneider, H. Toufar, A. Samoson, D. Freude, ^{17}O DOR and Other Solid-state NMR Studies Concerning the Basic Properties of Zeolites LSX, Solid State Nucl. Magn. Reson. 35 (2009) 87-92. https://doi.org/10.1016/j.ssnmr.2009.02.003.

[315] H.K.C. Timken, N. James, G.L. Turner, S.L. Lambert, L.B. Welsh, E. Oldfield, Solid-state ^{17}O NMR Spectroscopic Studies of Zeolites and Related Systems. Part 2, J. Am. Chem. Soc. 108 (1986) 7236-7241. https://doi.org/10.1021/ja00283a018.

[316] L. Peng, H. Huo, Y. Liu, C.P. Grey, ^{17}O Magic Angle Spinning NMR Studies of Bronsted Acid Sites in Zeolites HY and HZSM-5, J. Am. Chem. Soc. 129 (2007) 335-346. https://doi.org/10.1021/ja064922z.

[317] L. Peng, H. Huo, Z. Gan, C.P. Grey, ^{17}O MQMAS NMR Studies of Zeolite HY, Microporous Mesoporous Mater. 109 (2008) 156-162. https://doi.org/10.1016/j.micromeso.2007.04.039.

[318] J.-P. Amoureux, F. Bauer, H. Ernst, C. Fernandez, D. Freude, D. Michel, U.-T. Pingel, ^{17}O Multiple-quantum and ^{1}H MAS NMR Studies of Zeolite ZSM-5, Chem. Phys. Lett. 285 (1998) 10-14. https://doi.org/10.1016/S0009-2614(97)01462-0.

[319] K. Chen, A. Zornes, V. Nguyen, B. Wang, Z. Gan, S.P. Crossley, J.L. White, ^{17}O Labeling Reveals Paired Active Sites in Zeolite Catalysts, J. Am. Chem. Soc. 144 (2022) 16916-16929. https://doi.org/10.1021/jacs.2c05332.

[320] D. Prochnow, Festkörper-NMR-Untersuchungen an Phosphatmaterialien, PhD thesis, Universität Leipzig, Leipzig, 2003.

[321] J.M. Griffin, L. Clark, V.R. Seymour, D.W. Aldous, D.M. Dawson, D. Iuga, R.E. Morris, S.E. Ashbrook, Ionothermal 17O enrichment of oxides using microlitre quantities of labelled water, Chem. Sci. 3 (2012) 2293-2300. https://doi.org/10.1039/C2SC20155K.

[322] A. Sutrisno, B.E.G. Lucier, L. Zhang, L.H. Ding, Y.Y. Chu, A.M. Zheng, Y.N. Huang, Inspecting the Structure and Formation of Molecular Sieve SAPO-34 via ^{17}O Solid-State NMR Spectroscopy, J. Phys. Chem. C 122 (2018) 7260-7277. https://doi.org/10.1021/acs.jpcc.8b00746.

[323] G.P.M. Bignami, D.M. Dawson, V.R. Seymour, P.S. Wheatley, R.E. Morris, S.E. Ashbrook, Synthesis, Isotopic Enrichment, and Solid-State NMR Characterization of Zeolites Derived from the Assembly, Disassembly, Organization, Reassembly Process, J. Am. Chem. Soc. 139 (2017) 5140-5148. https://doi.org/10.1021/jacs.7b00386.

[324] S.E. Ashbrook, R. Morris, C.M. Rice, Understanding the synthesis and reactivity of ADORable zeolites using NMR spectroscopy, COCIS 61 (2022). https://doi.org/10.1016/j.cocis.2022.101634.

[325] G.P.M. Bignami, Z.H. Davis, D.M. Dawson, S.A. Morris, S.E. Russell, D. McKay, R.E. Parke, D. Iuga, R.E. Morris, S.E. Ashbrook, Cost-effective ¹⁷O enrichment and NMR spectroscopy of mixed-metal terephthalate metal-organic frameworks, 9 (2018) 850-859. https://doi.org/10.1039/c7sc04649a.

[326] V. Martins, J. Xu, I. Hung, Z. Gan, C. Gervais, C. Bonhomme, Y. Huang, ^{17}O solid-state NMR at ultrahigh magnetic field of 35.2 T: Resolution of inequivalent oxygen sites in different phases of MOF MIL-53(Al), Magn. Reson. Chem. 59 (2021) 940-950. https://doi.org/https://doi.org/10.1002/mrc.5122.

[327] C.M. Rice, Z.H. Davis, D. McKay, G.P.M. Bignami, R.G. Chitac, D.M. Dawson, R.E. Morris, S.E. Ashbrook, Following the unusual breathing behaviour of 17O-enriched mixed-metal (Al,Ga)-MIL-53 using NMR crystallography, Phys. Chem. Chem. Phys., 22 (2020) 14514-14526. https://doi.org/10.1039/D0CP02731F.

[328] Z.H. Davis, R.E. Morris, S.E. Ashbrook, Exploring cation distribution in ion-exchanged Al,Ga-containing metal-organic frameworks using ^{17}O NMR spectroscopy, Phys. Chem. Chem. Phys. 25 (2023) 20267-20280. https://doi.org/10.1039/d3cp03071g.

[329] V. Martins, J. Xu, X.L. Wang, K.Z. Chen, I. Hung, Z.H. Gan, C. Gervais, C. Bonhomme, S.J. Jiang, A.M. Zheng, B.E.G. Lucier, Y.N. Huang, Higher Magnetic Fields, Finer MOF Structural Information: ^{17}O Solid-State NMR at 35.2 T, J. Am. Chem. Soc. 142 (2020) 14877-14889. https://doi.org/10.1021/jacs.0c02810.

[330] Z. Xu, J.F. Stebbins, Oxygen Sites in the Zeolite Stilbite: A Comparison of Static, MAS, VAS, DAS and Triple Quantum MAS NMR Techniques, Solid State Nucl. Magn. Reson. 11 (1998) 243-251. https://doi.org/0.1016/s0926-2040(97)00019-2.

[331] X. Cheng, P.D. Zhao, J.F. Stebbins, Solid state NMR Study of Oxygen Site Exchange and Al-O-Al Site Concentration in Analcime, Am. Mineral. 85 (2000) 1030-1037. https://doi.org/10.2138/am-2000-0718.

[332] S. Kroeker, P.S. Neuhoff, J.F. Stebbins, Enhanced Resolution and Quantitation from 'Ultrahigh' Field NMR Spectroscopy of Glasses, J. Non Cryst. Solids. 293 (2001) 440-445. https://doi.org/10.1016/S0022-3093(01)00693-7.

[333] Z. Xu, H. Maekawa, J.V. Oglesby, J.F. Stebbins, Oxygen Speciation in Hydrous Silicate Glasses: An Oxygen-17 NMR Study, J. Am. Chem. Soc. 120 (1998) 9894. https://doi.org/10.1021/ja981459k.

[334] S.K. Lee, J.F. Stebbins, O Atom Sites in Natural Kaolinite and Muscovite: ^{17}O MAS and 3QMAS NMR Study, Am. Mineral. 88 (2003) 493-500. https://doi.org/10.2138/am-2003-0403.

[335] S.K. Lee, J.F. Stebbins, C.A. Weiss, R.J. Kirkpatrick, ^{17}O and ^{27}Al MAS and 3QMAS NMR Study of Synthetic and Natural Layer Silicates, Chem. Mater. 15 (2003) 2605-2613. https://doi.org/10.1021/cm030165h.

[336] T. Schaller, J.F. Stebbins, The Structural Role of Lanthanum and Yttrium in Aluminosilicate Glasses: A ^{27}Al and ^{17}O MAS NMR Study, J. Phys. Chem. B 102 (1998) 10690-10697. https://doi.org/10.1021/jp982387m.

[337] P.J. Dirken, S.C. Kohn, M.E. Smith, E.R.H. van Eck, Complete Resolution of Si-O-Si and Si-O-Al Fragments in an Aluminosilicate Glass by ^{17}O Multiple-quantum Magic-angle Spinning NMR Spectroscopy, Chem. Phys. Lett. 266 (1997) 568-574. https://doi.org/10.1016/S0009-2614(97)00041-9.

[338] S.K. Lee, J.F. Stebbins, The Structure of Aluminosilicate Glasses: High-resolution ^{17}O and ^{27}Al MAS and 3QMAS NMR Study, J. Phys. Chem. B. 104 (2000) 4091-4100. https://doi.org/10.1021/jp994273w.

[339] F. Angeli, T. Charpentier, S. Gin, J.C. Petit, ^{17}O 3Q-MAS NMR Characterization of a Sodium Aluminoborosilicate Glass and its Alteration Gel, Chem. Phys. Lett. 341 (2001) 23-28. https://doi.org/10.1016/S0009-2614(01)00423-7.

[340] J.F. Stebbins, Z. Xu, NMR Evidence for Excess Non-bridging Oxygen in an Aluminosilicate Glass, Nature 390 (1997) 60-62. https://doi.org/10.1038/36312.

[341] A. Jaworski, B. Stevensson, M. Eden, The Bearings from Rare-Earth (RE = La, Lu, Sc, Y) Cations on the Oxygen Environments in Aluminosilicate Glasses: A Study by Solid State O-17 NMR, Molecular Dynamics Simulations, and DFT Calculations, J. Phys.Chem. C 120 (2016) 13181-13198. https://doi.org/10.1021/acs.jpcc.6b02032.

[342] B.R. Cherry, T.M. Alam, C. Click, R.K. Brow, Z.H. Gan, Combined ab Initio Computational and Solid-state ^{17}O MAS NMR Studies of Crystalline P_2O_5, J. Phys. Chem. B 107 (2003) 4894-4903. https://doi.org/10.1021/jp0272670.

[343] G. Wu, D. Rovnyak, P.C. Huang, R.G. Griffin, High-resolution ^{17}O NMR Spectroscopy of Solids by Multiple-quantum Magic-angle Spinning, Chem. Phys. Lett. 277 (1997) 79-83. https://doi.org/10.1016/S0009-2614(97)00873-7.

[344] D. Prochnow, A.R. Grimmer, D. Freude, Solid-state NMR Studies of ^{17}O-enriched Pyrophosphates, Solid State Nucl. Magn. Reson. 30 (2006) 69-74. https://doi.org/10.1016/j.ssnmr.2006.02.004.

[345] M. Zeyer, L. Montagne, V. Kostoj, G. Palavit, D. Prochnow, C. Jaeger, ^{17}O NMR Study of Na_2O-P_2O_5 Glasses, J. Non-Cryst. Solids 311 (2002) 223-232. https://doi.org/10.1016/S0022-3093(02)01420-5.

[346] F. Munoz, L. Delevoye, L. Montagne, T. Charpentier, New Insights into the Structure of Oxynitride NaPON Phosphate Glasses by 17-Oxygen NMR, J. Non-Cryst. Solids 363 (2013) 134-139. https://doi.org/10.1016/j.jnoncrysol.2012.12.028.

[347] M. Zeyer-Dusterer, L. Montagne, G. Palavit, C. Jager, Combined ^{17}O NMR and ^{11}B-^{31}P Double Resonance NMR Studies of Sodium Borophosphate glasses, Solid State Nucl. Magn. Reson. 27 (2005) 50-64. https://doi.org/10.1016/j.ssnmr.2004.06.009.

[348] G. Kim, J.M. Griffin, F. Blanc, D.M. Halat, S.M. Haile, C.P. Grey, Revealing Local Dynamics of the Protonic Conductor CsH(PO3H) by Solid-State NMR Spectroscopy and First-Principles Calculations, J. Phys. Chem. C 121 (2017) 27830-27838. https://doi.org/10.1021/acs.jpcc.7b09063.

[349] R. Hussin, D. Holland, R. Dupree, Does Six-coordinate Germanium Exist in Na_2O-GeO_2 Glasses - ^{17}O NMR Measurements, J. Non-Cryst. Solids 234 (1998) 440-445. https://doi.org/10.1016/S0022-3093(98)00394-9.

[350] R. Hussin, R. Dupree, D. Holland, The Ge-O-Ge Bond Angle Distribution in GeO_2 Glass: A NMR Determination, J. Non-Cryst. Solids 246 (1999) 159-168. https://doi.org/10.1016/s0022-3093(99)00090-3.

[351] T.J. Bastow, M.E. Smith, H.J. Whitfield, ^{17}O NMR Investigation of Hafnia and Ternary Hafnium Oxides, J. Mater. Chem. 6 (1996) 1951-1955. https://doi.org/10.1039/JM9960601951.

[352] J.J. Barieux, J.P. Schirmann, ^{17}O-Enriched Hydrogen Peroxide and T.Butyl Hydroperoxide: Synthesis, Characterization and Some Applications, Tetrahedron Lett. 28 (1987) 6443-6446. https://doi.org/http://dx.doi.org/10.1016/S0040-4039(00)96883-7.

[353] O. Lumpkin, W.T. Dixon, ^{17}O Pure Quadrupole Resonances in Hydrogen Peroxide, J. Chem. Phys. 71 (1979) 3550-3551. https://doi.org/doi:http://dx.doi.org/10.1063/1.438779.

[354] H.J. Jakobsen, H. Bildsoe, M. Brorson, G. Wu, P.L. Gor'kov, Z.H. Gan, I. Hung, High-Field ^{17}O MAS NMR Reveals ^{1}J (^{17}O-^{127}I) with its Sign and the NMR Crystallography of the Scheelite Structures for $NaIO_4$ and KIO_4, J. Phys. Chem. C 119 (2015) 14434-14442. https://doi.org/10.1021/acs.jpcc.5b03721.

[355] H.J. Jakobsen, H. Bildsoe, M. Brorson, Z.H. Gan, I. Hung, Direct Observation of ^{17}O-$^{185/187}$Re ^{1}J-Coupling in Perrhenates by Solid-state ^{17}O VT MAS NMR: Temperature and Self-decoupling Effects, J. Magn. Reson. 230 (2013) 98-110. https://doi.org/10.1016/j.jmr.2013.01.012.

[356] T.J. Bastow, Materials Characterisation by Nuclear Quadrupole Interaction, Z. Naturforsch. A 49 (1994) 320-328. https://doi.org/10.1515/zna-1994-1-247.

[357] L. Sulcek, R. Langner, U. Werner-Zwanziger, J.W. Zwanziger, C. Martineau-Corcos, M. Fechtelkord, Solid-state nuclear magnetic resonance investigation of synthetic phlogopite and lepidolite samples, Magn. Reson. Chem. 58 (2020) 1099-1108. https://doi.org/10.1002/mrc.4998.

[358] M. Leskes, N.E. Drewett, L.J. Hardwick, P.G. Bruce, G.R. Goward, C.P. Grey, Direct Detection of Discharge Products in Lithium–Oxygen Batteries by Solid-State NMR Spectroscopy, Angew. Chem. Int. Ed. 51 (2012) 8560-8563. https://doi.org/10.1002/anie.201202183.

[359] C. Gervais, F. Babonneau, M.E. Smith, Detection, Quantification, and Magnetic Field Dependence of Solid-state ^{17}O NMR of X-O-Y (X,Y = Si,Ti) Linkages: Implications for Characterizing Amorphous Titania-silica-based Materials, J. Phys. Chem. B. 105 (2001) 1971-1977. https://doi.org/10.1021/jp003519q.

[360] H.R.X. Pimentel, D.L.M. Aguiar, R.A.S. San Gil, E.F. Souza, A.R. Ferreira, A.A. Leitao, R.B. Alencastro, S.M.C. Menezes, S.S.X. Chiaro, ^{17}O MAS NMR and First Principles Calculations of ZrO_2 Polymorphs, Chem. Phys. Lett. 555 (2013) 96-100. https://doi.org/10.1016/j.cplett.2012.10.060.

[361] B. Julian, C. Gervais, M.N. Rager, J. Maquet, E. Cordoncillo, P. Escribano, F. Babonneau, C. Sanchez, Solid-state ^{17}O NMR Characterization of PDMS-M_xO_y (M = Ge(IV), Ti(IV), Zr(IV), Nb(V), and Ta(V)) Organic-inorganic Nanocomposites, Chem. Mater. 16 (2004) 521-529. https://doi.org/10.1021/cm034958f.

[362] C.J. Fontenot, J.W. Wiench, G.L. Schrader, M. Pruski, ^{17}O MAS and 3QMAS NMR Investigation of Crystalline V_2O_5 and Layered V_2O_5•H_2O Gels, J. Am. Chem. Soc. 124 (2002) 8435-8444. https://doi.org/10.1021/ja0265254.

[363] M. LaComb, J.F. Stebbins, Tricluster Oxygen Atoms in Crystalline and Glassy SrB_4O_7: High Resolution ^{11}B and ^{17}O Nuclear Magnetic Resonance Analysis, J. Non-Cryst. Solids 428 (2015) 105-111. https://doi.org/10.1016/j.jnoncrysol.2015.08.014.

[364] L.S. Du, J.F. Stebbins, Site Connectivities in Sodium Aluminoborate Glasses: Multinuclear and Multiple Quantum NMR Results, Solid State Nucl. Magn. Reson. 27 (2005) 37-49. https://doi.org/10.1016/j.ssnmer.2004.08.003.

[365] S. Wang, J.F. Stebbins, Multiple-quantum Magic-angle Spinning ^{17}O NMR Studies of Borate, Borosilicate, and Boroaluminate Glasses, J. Am. Ceram. Soc. 82 (1999) 1519-1528. https://doi.org/10.1111/j.1151-2916.1999.tb01950.x.

[366] V. Lafond, C. Gervais, J. Maquet, D. Prochnow, F. Babonneau, P.H. Mutin, ^{17}O MAS NMR Study of the Bonding Mode of Phosphonate Coupling Molecules in a Titanium Oxo-alkoxo-phosphonate and in Titania-based Hybrid Materials, Chem. Mater. 15 (2003) 4098-4103. https://doi.org/10.1021/cm031061+.

[367] E.R.H. Van Eck, M.E. Smith, Orientation of the Quadrupole and Dipole Tensors of Hydroxyl Groups by ^{17}O Quadrupole Separated Local Field NMR, J. Chem. Phys. 108 (1998) 5904-5912. https://doi.org/10.1063/1.476001.

[368] R. Dervisoglu, D.S. Middlemiss, F. Blanc, L.A. Holmes, Y.L. Lee, D. Morgan, C.P. Grey, Joint Experimental and Computational ^{17}O Solid State NMR Study of Brownmillerite $Ba_2In_2O_5$, Phys. Chem. Chem. Phys. 16 (2014) 2597-2606. https://doi.org/10.1039/c3cp53642d.

[369] R. Dervisoglu, D.S. Middlemiss, F. Blanc, Y.L. Lee, D. Morgan, C.P. Grey, Joint Experimental and Computational ^{17}O and ^{1}H Solid State NMR Study of $Ba_2In_2O_4(OH)_2$ Structure and Dynamics, Chem. Mater. 27 (2015) 3861-3873. https://doi.org/10.1021/acs.chemmater.5b00328.

[370] R.K. Harris, M.J. Leach, D.P. Thompson, ^{15}N and ^{17}O NMR Spectroscopy of Silicates and Nitrogen Ceramics, Chem. Mater. 4 (1992) 260-267. https://doi.org/10.1021/cm00020a009.

[371] Y.Z. Dai, I. Hung, Z.H. Gan, G. Wu, Probing Nitrite Ion Dynamics in $NaNO_2$ Crystals by Solid-State ^{17}O NMR, Concepts Magn. Reson. A 45A (2016). https://doi.org/10.1002/cmr.a.21409.

[372] J.S. Lu, X.Q. Kong, V. Terskikh, G. Wu, Solid-State ^{17}O NMR of Oxygen-Nitrogen Singly Bonded Compounds: Hydroxylammonium Chloride and Sodium Trioxodinitrate (Angeli's Salt), J. Phys. Chem. A 119 (2015) 8133-8138. https://doi.org/10.1021/acs.jpca.5b05466.

[373] I.J.F. Poplett, 1H/2H and 1H/17O Nuclear Quadrupole Double-Resonance Study of Several Hydroxide Comounds. I. The Hydroxide Ion, J. Magn. Reson. 50 (1982) 382-396. https://doi.org/10.1016/0022-2364(82)90003-8.

[374] M.E. Smith, S. Steuernagel, H.J. Whitfield, ^{17}O Magic-angle Spinning NMR of $CaCO_3$, Solid State Nucl. Magn. Reson. 4 (1995) 313-316. https://doi.org/10.1016/0926-2040(95)00010-N.

[375] L. Martel, N. Magnani, J.F. Vigier, J. Boshoven, C. Selfslag, I. Farnan, J.C. Griveau, J. Somers, T. Fanghanel, High-Resolution Solid-State Oxygen-17 NMR of Actinide-Bearing Compounds: An Insight into the 5f Chemistry, Inorg. Chem. 53 (2014) 6928-6933. https://doi.org/10.1021/ic5007555.

[376] A. Fernandes, R.F. Moran, S. Sneddon, D.M. Dawson, D. McKay, G.P.M. Bignami, F. Blanc, K.R. Whittle, S.E. Ashbrook, ^{17}O Solid-State NMR Spectroscopy of $A_2B_2O_7$ Oxides: Quantitative Isotopic Enrichment and Spectral Acquisition?, Rsc Adv. 8 (2018) 7089-7101. https://doi.org/10.1039/c8ra00596f.

[377] A. Fernandes, R.F. Moran, D. McKay, B.L. Griffiths, A. Herlihy, K.R. Whittle, D.M. Dawson, S.E. Ashbrook, Exploring cation disorder in mixed-metal pyrochlore ceramics using ^{17}O NMR spectroscopy and first-principles calculations, Magn. Reson. Chem. 59 (2021) 961-974. https://doi.org/https://doi.org/10.1002/mrc.5140.

[378] E.G. Keeler, V.K. Michaelis, C.B. Wilson, I. Hung, X.L. Wang, Z.H. Gan, R.G. Griffin, High-Resolution ^{17}O NMR Spectroscopy of Structural Water, J. Phys. Chem. B 123 (2019) 3061-3067. https://doi.org/10.1021/acs.jpcb.9b02277.

[379] M.N. Garaga, U. Werner-Zwanziger, J.W. Zwanziger, A. DeCeanne, B. Hauke, K. Bozer, S. Feller, Short-Range Structure of TeO_2 Glass, J. Phys. Chem. C 121 (2017) 28117-28124. https://doi.org/10.1021/acs.jpcc.7b08978.

[380] D.M. Halat, R. Dervisoglu, G. Kim, M.T. Dunstan, F. Blanc, D.S. Middlemiss, C.P. Grey, Probing Oxide-Ion Mobility in the Mixed Ionic-Electronic Conductor La2NiO4+delta by Solid-State O-17 MAS NMR Spectroscopy, J. Am. Chem. Soc. 138 (2016) 11958-11969. https://doi.org/10.1021/jacs.6b07348.

[381] S. Nour, C.M. Widdifield, L. Kobera, K.M.N. Burgess, D. Errulat, V.V. Terskikh, D.L. Bryce, Oxygen-17 NMR Spectroscopy of Water Molecules in Solid Hydrates, Can. J. Chem. 94 (2016) 189-197. https://doi.org/10.1139/cjc-2015-0547.