MOZ

MOZ.1 Zeolite framework type and topology

The designation of the framework type code (FTC) refers to the type material ZS**M**-10 (Zeolite Socony Mobil with sequence number **O**ne **Z**ero), a synthetic zeolite first synthesized by Ciric [72Cir1]. Two possible framework structures have been proposed by [96Hig1] based on model building one of which has been finally confirmed by [2006Dor1]. The framework structure (Fig. MOZ.1.1) consists of two different 12-ring channels (**lel** channel (Fig. MOZ.1.4a) formed by *lil* ($4^{12}4^6 8^6 12^2$) units, **off** channel (Fig. MOZ.1.4b) formed by *kno* ($4^3 8^3 12^2$) units) and two different 8-ring channels (**too** channel (Fig. MOZ.1.4c) formed by *pau* ($4^8 4^4 8^4 8^2$) units, **kbi** channel (Fig. MOZ.1.4d) formed by *ste* ($4^2 8^4$) units) crosslinked by **khb** pillars consisting of an alternating sequence of *can* ($4^6 6^3 6^2$) and *hpr* ($4^6 6^2$) units all running parallel **c**. The channels intersect an 8-ring channel (Fig. MOZ.1.4e) parallel **a** (and symmetrically equivalent directions) consisting of an alternating sequence of *lil* and *ste* units.

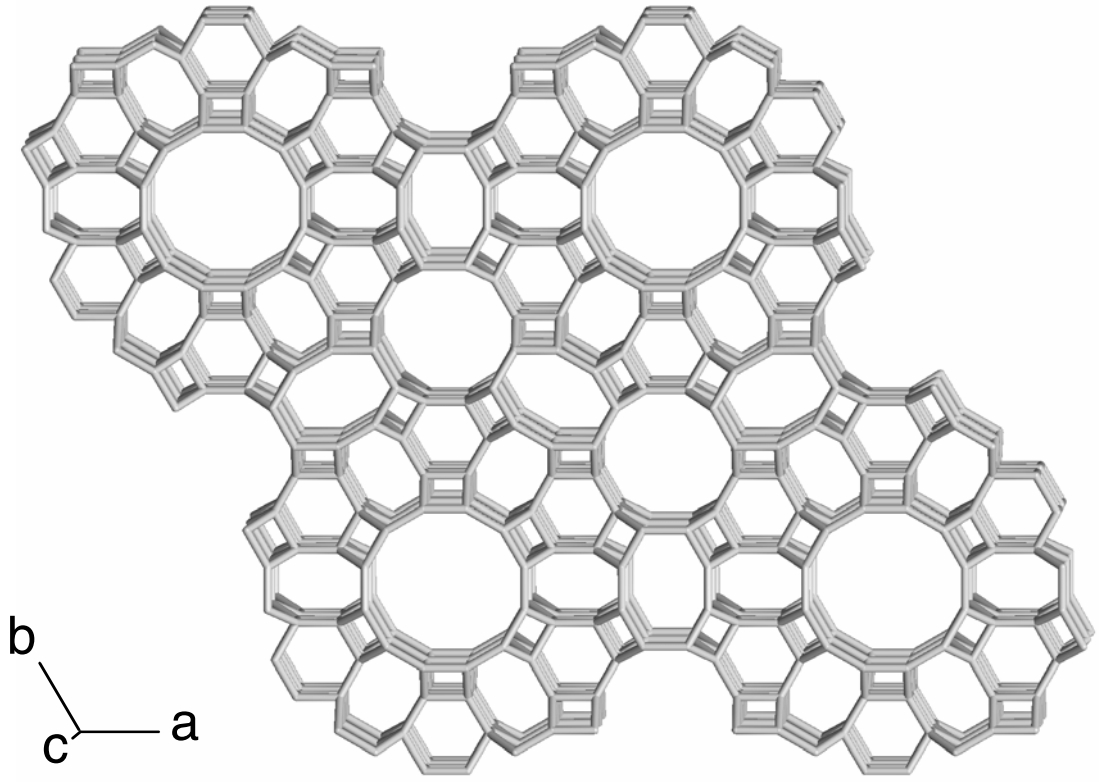
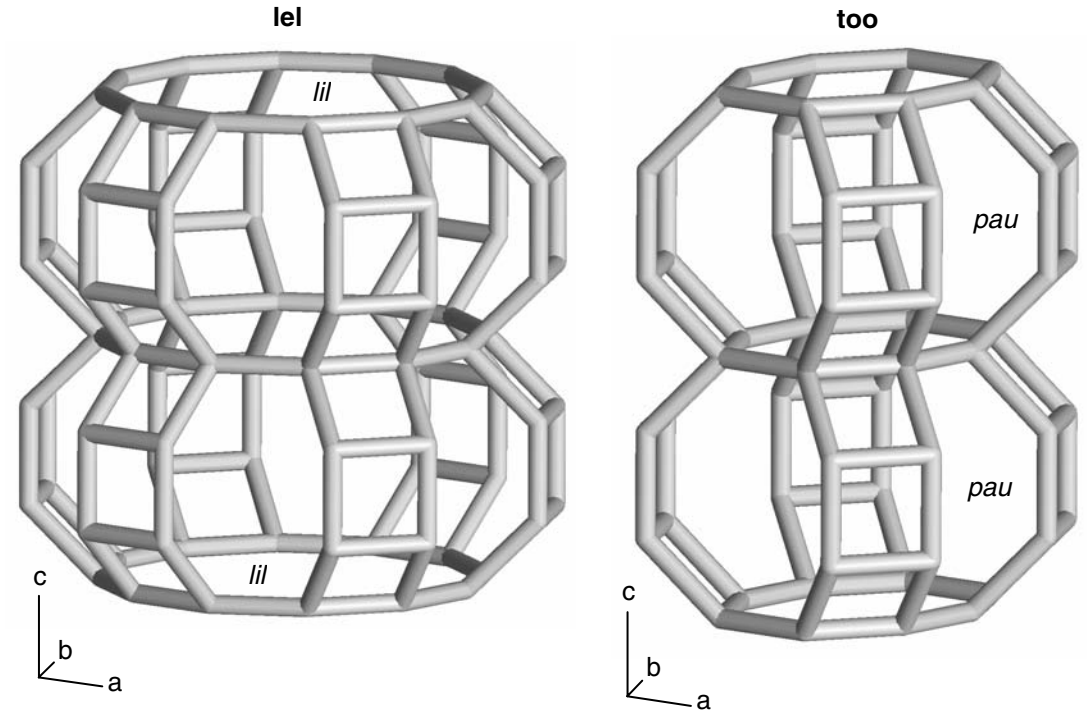
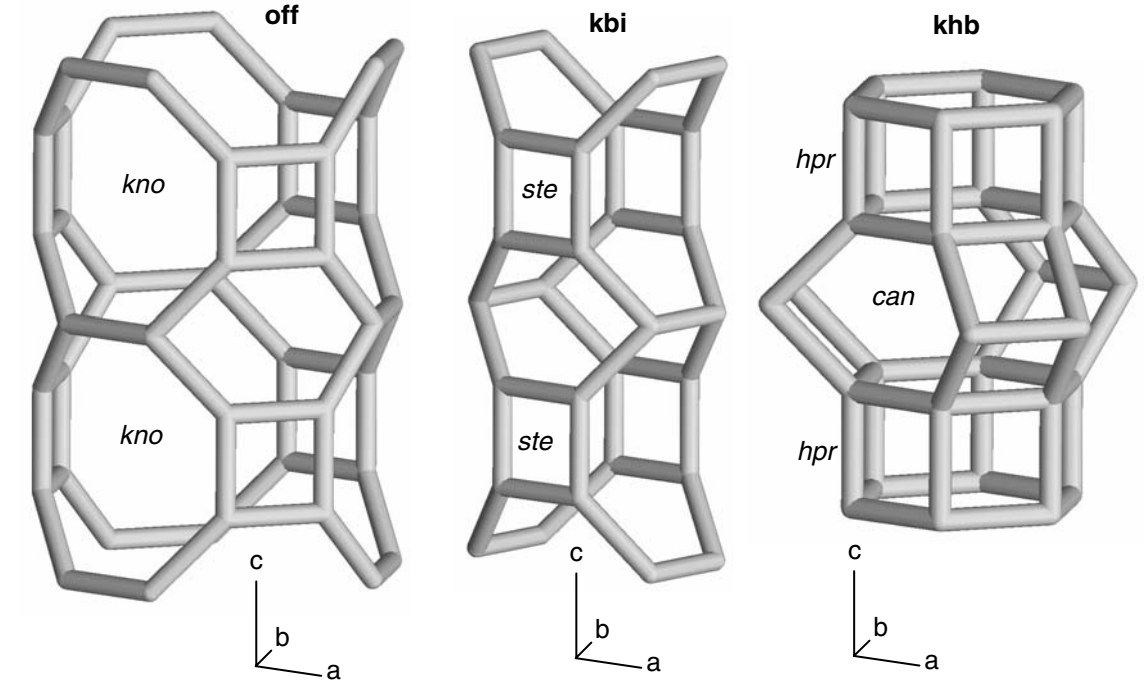


Fig. MOZ.1.1. The framework structure of MOZ-type compounds in the highest possible topological symmetry *P* 6/*mmm*. View parallel [001] rotated by 4° about [100] and 2° about [120].



a Linkage of *lil* units forming the **lel** channel (left), and *pau* units forming the **too** channel (right).



b Linkage of *kno* units forming the **off** channel (left), *ste* units forming the **kbi** channel (center), and *can* and *hpr* units forming the **khb** pillar (right).

MOZ.1.2. One-dimensional units parallel [001]. View parallel [$0\bar{1}\ 0$] rotated by 10° about [210] and [001].

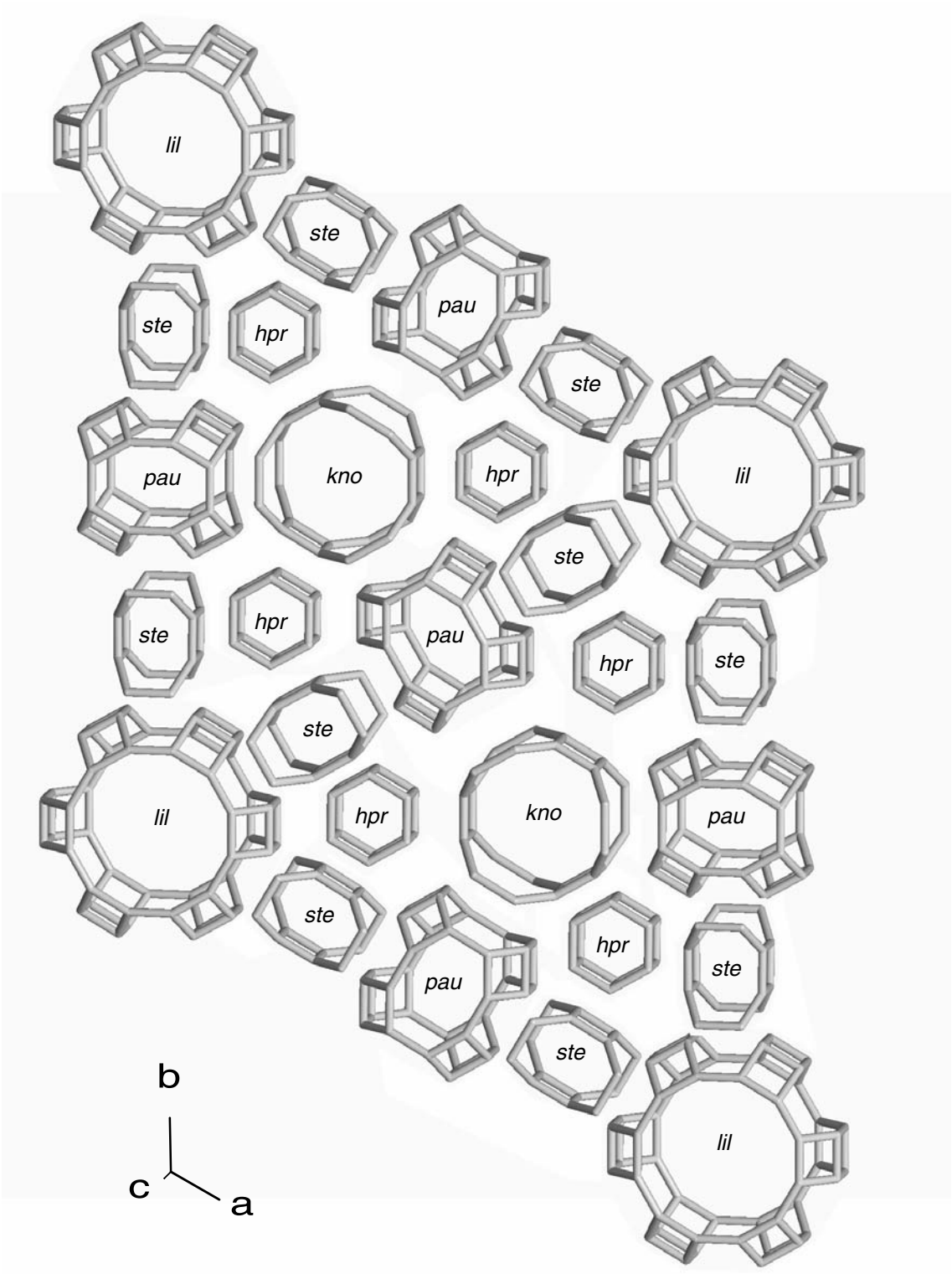
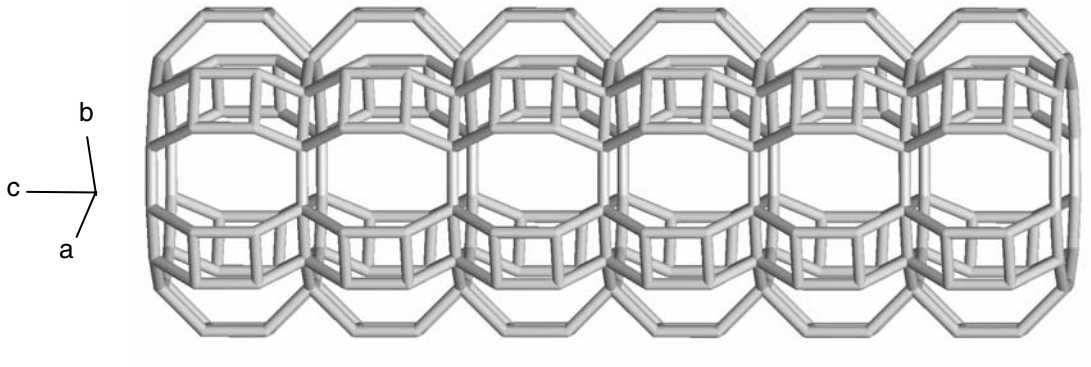
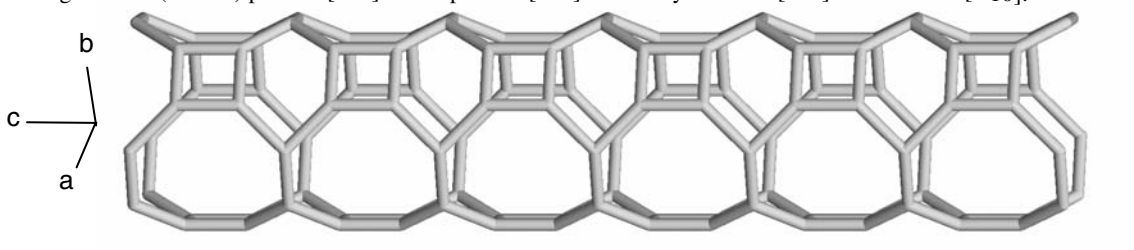


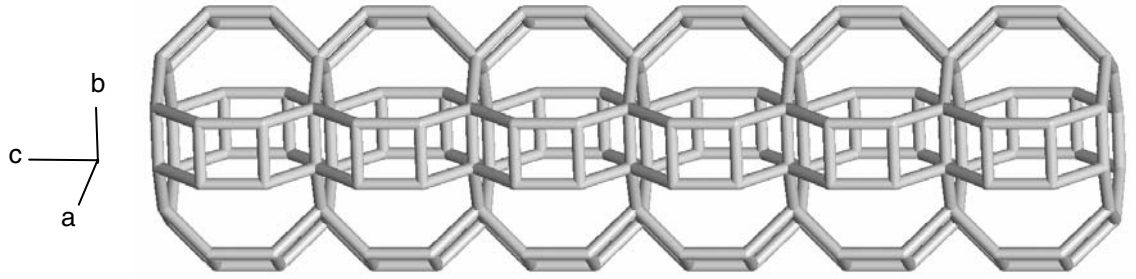
Fig. MOZ.1.3. Building scheme of MOZ-type compounds. View parallel [001] rotated by 6° about [210] and [010].



a 12-ring channel (**lel** unit) parallel [001]. View parallel [110] rotated by 4° about [001] and 6° about [$\bar{1}$10].

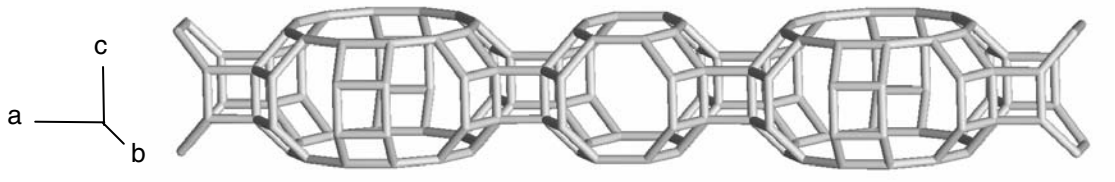


b 12-ring channel (**off** unit) parallel [001]. View parallel [110] rotated by 4° about [001] and 6° about [$\bar{1}$10].



c 8-ring channel (**too** unit) parallel [001]. View parallel [110] rotated by 10° about [001] and 6° about [$\bar{1}$10].

d 8-ring channel (**kbi** unit) parallel [001]. View parallel [120] rotated by 10° about [001] and [100].



e 8-ring channel parallel [100]. View parallel [120] rotated by 10° about [001] and [100].

Fig. MOZ.1.4. Channels in MOZ-type compouinds.

MOZ.2 Compounds and crystal data

Table MOZ.2.1 Chemical data.

FD = framework density CE = cation exchange TT = thermal treatment REF = reference
SM = source of material SR = sorbate T = temperature of thermal treatment [K]

code	chemical composition	FD	SM	CE	SR	TT	T	REF
P* 6/*m m m								
MOZ1996a01	$H_{24} \cdot Al_{24}Si_{84}O_{216}$	16.6	S	NH_4	-	C	773	96Hig1
MOZ2005a01	$Si_{108}O_{216}$	17.0	T	-	-	-	-	2005Fos1
MOZ2006a01	$H_{24} \cdot Al_{24}Si_{84}O_{216}$	16.8	S	NH_4	-	C	773	2006Dor1

Table MOZ.2.2 Structural parameters of MOZ-type compounds.

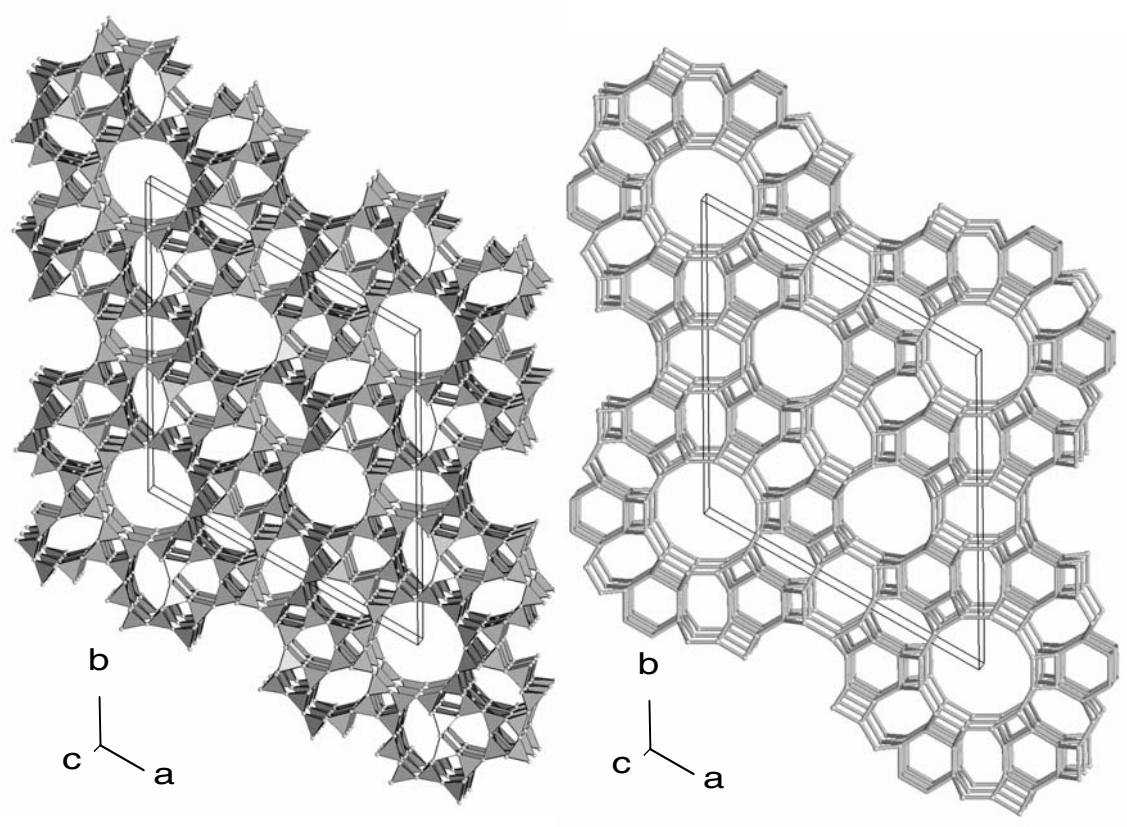
code	*a* [Å]	*c* [Å]	*V* [Å^3]	*T* [K]	reference
P* 6/*m m m					
MOZ1996a01	31.575(7)	7.525(4)	6497	n.s.	96Hig1
MOZ2005a01[1])	31.4750	7.3893	6340	-	2005Fos1
MOZ2006a01	31.390(2)	7.5147(8)	6412	n.s.	2006Dor1

[1]) Origin shift 0,0,½

MOZ.3 Framework structure of the MOZ-I compound (*P* 6/*m m m*, IT #191)

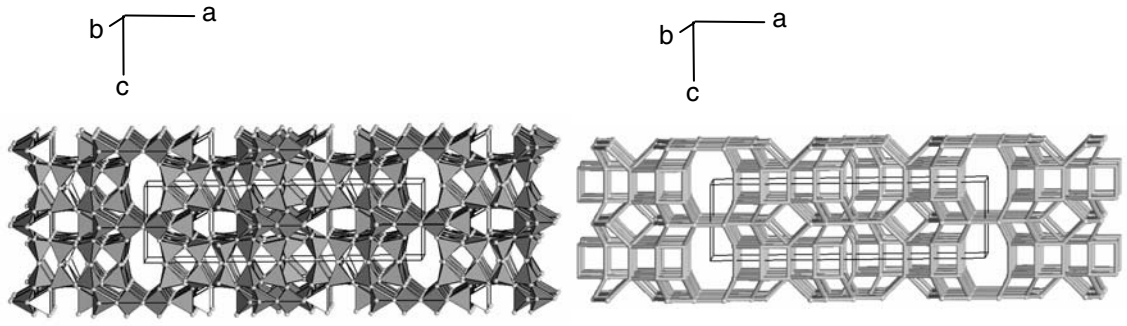
Table MOZ.3.2 Selected interatomic distances and angles for ZSM-10, $H_{24} \cdot Al_{24}Si_{84}O_{216}$ (MOZ2006a01, 2006Dor1).

	T - O [Å]	T - O - T [°]		T - O [Å]	T - O - T [°]
(Si,Al)1– O2	1.601(9)	134.8(4)	(Si,Al)2– O2	1.616(10)	134.8(4)
(Si,Al)1– O1	1.622(10)	148.8(5)	(Si,Al)2– O4	1.622(10)	140.4(6)
(Si,Al)1– O7	1.637(8)	148.3(11)	(Si,Al)2– O3	1.623(7)	145.6(6)
(Si,Al)1– O10	1.666(5)	153.3(13)	(Si,Al)2– O8	1.629(5)	157.8(5)
mean	1.632	146.3	mean	1.622	144.7
(Si,Al)3– O4	1.616(11)	140.4(6)	(Si,Al)4– O14	1.610(12)	128.3(7)
(Si,Al)3– O11	1.619(3)	148.2(7)	(Si,Al)4– O1	1.618(7)	148.8(5)
(Si,Al)3– O5	1.627(8)	146.7(6)	(Si,Al)4– O1	1.618(7)	148.8(5)
(Si,Al)3– O9	1.630(6)	155.7(12)	(Si,Al)4– O12	1.619(4)	144.6(7)
mean	1.623	147.8	mean	1.616	142.6
(Si,Al)5– O15	1.617(9)	131.8(9)	(Si,Al)6– O6	1.619(13)	149.8(9)
(Si,Al)5– O6	1.620(15)	149.8(9)	(Si,Al)6– O5	1.622(4)	146.7(6)
(Si,Al)5– O3	1.620(8)	145.6(6)	(Si,Al)6– O5	1.622(4)	146.7(6)
(Si,Al)5– O3	1.620(8)	145.6(6)	(Si,Al)6– O13	1.624(11)	169.2(6)
mean	1.619	143.2	mean	1.622	153.1



a View parallel [001] rotated by 5° about [210] and [010] .

b Ball and stick model corresponding to a).



c View parallel [010] rotated by 1° about [210] and 0.5° about [001] .

d Ball and stick model corresponding to c).

Fig. MOZ.3.1.1 Projections of the crystal structure of ZSM-10, $H_{24} \cdot Al_{24}Si_{84}O_{216}$ (MOZ2006a01, 2006Dor1).

Table MOZ.3.1 Atomic coordinates and site definitions for ZSM-10, $H_{24} \cdot Al_{24}Si_{84}O_{216}$ (MOZ2006a01, 2006Dor1).

atom	*x*	*y*	*z*	*B* [Å^2]	site symmetry	Wyckoff position	no. of atoms in unit cell
(Si,Al)1	0.2869(3)	0.1951(2)	0.2096(9)	1.42	1	24(r)	18.67/5.33
(Si,Al)2	0.3827(3)	0.2885(3)	0.2127(6)	1.42	1	24(r)	18.67/5.33
(Si,Al)3	0.4804(3)	0.2898(2)	0.2120(7)	1.42	1	24(r)	18.67/5.33
(Si,Al)4	0.2049(3)	0.1516(2)	½	1.42	*m* . .	12(q)	9.33/2.67
(Si,Al)5	0.4245(4)	0.3702(3)	½	1.42	*m* . .	12(q)	9.33/2.67
(Si,Al)6	0.5250(2)	0.3720(2)	½	1.42	*m* . .	12(q)	9.33/2.67
O1	0.2372(3)	0.1781(3)	0.3244(5)	1.97	1	24(r)	24
O2	0.3307(3)	0.2454(3)	0.2885(1)	1.97	1	24(r)	24
O3	0.3976(4)	0.3384(3)	0.3235(6)	1.97	1	24(r)	24
O4	0.4235(3)	0.2725(4)	0.2536(2)	1.97	1	24(r)	24
O5	0.5176(3)	0.3386(2)	0.3254(6)	1.97	1	24(r)	24
O6	0.4823(4)	0.3866(6)	½	1.97	*m* . .	12(q)	12
O7	0.2779(6)	0.2025(8)	0	1.97	*m* . .	12(p)	12
O8	0.3802(7)	0.2970(5)	0	1.97	*m* . .	12(p)	12
O9	0.4903(7)	0.3015(7)	0	1.97	*m* . .	12(p)	12
O10	0.1502(7)	2*x*	0.224(4)	1.97	. *m* .	12(o)	12
O11	0.2445(7)	2*x*	0.2621(3)	1.97	. *m* .	12(o)	12
O12	0.0934(3)	2*x*	½	1.97	*m m* 2	6(m)	6
O13	0.4207(4)	2*x*	½	1.97	*m m* 2	6(m)	6
O14	0.1559(4)	0	½	1.97	*m* 2 *m*	6(k)	6
O15	0.4184(5)	0	½	1.97	*m* 2 *m*	6(k)	6

MOZ.4 Chemical composition

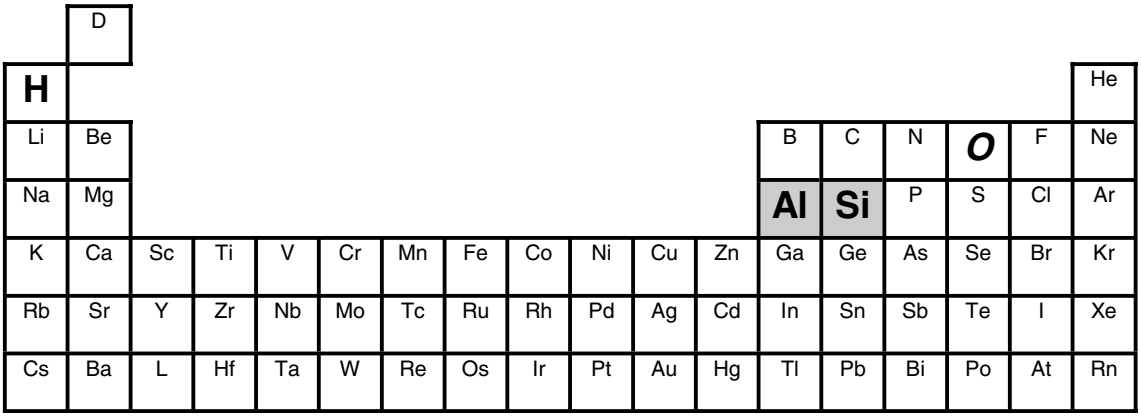


Fig. MOZ.4.1 Chemical elements (highlighted) occurring in MOZ-type compounds. Framework cations are in grey fields.

MOZ.5 Flexibility and apertures

There is insufficient information about the MOZ-type framework to deduce anything about its flexibility.

The 12-ring openings of the channels parallel **c** are about as open as those in the FAU-type framework with free diameters of about 7.5 Å.

MOZ.6 Other information

No useful properties of MOZ-type frameworks have been reported.

MOZ.7 References

72Cir1 Ciric, J.: U.S. Patent No. 3,692,470 (1972).

96Hig1 Higgins, J.B., Schmitt, K.D.: Zeolites **16** (1996) 236.

2005Fos1 Foster, M.D., Treacy, M.M., Higgins, J.B., Rivin, I., Balkovsky, E., Randall, K.H.: J. Appl. Crystallogr. **38** (2005) 1028.

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