NON

NON.1 Zeolite framework type and topology

The designation of the FTC is derived from the type material **NON**asil-[$4^1 5^8$] referring to the silica framework built from 9-hedra [86Mar1]. The framework structure (Fig. NON.1.1) can be described as being built from *nns* ($5^4 5^4 6^8 6^4$) units in the origin of the F-centered unit cell crosslinked by *nna* ($5^4 6^4$) and *non* ($4^1 5^4 5^2 5^2$) units forming the clathrate compound, thus consisting of three types of cages as shown in Fig. NON.1.2.

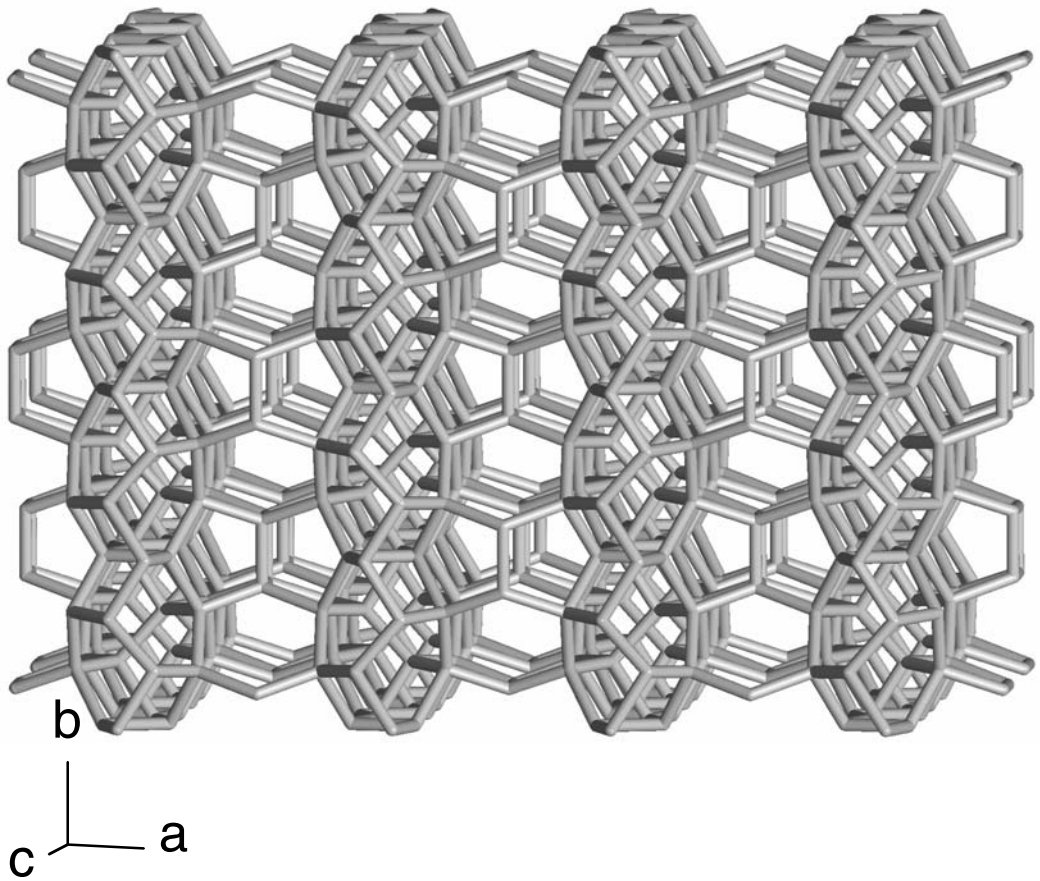
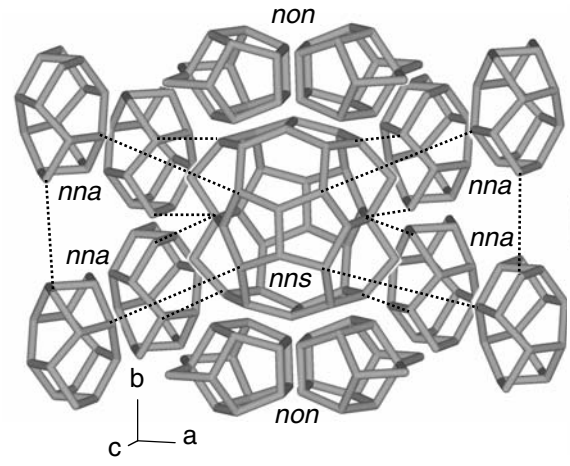
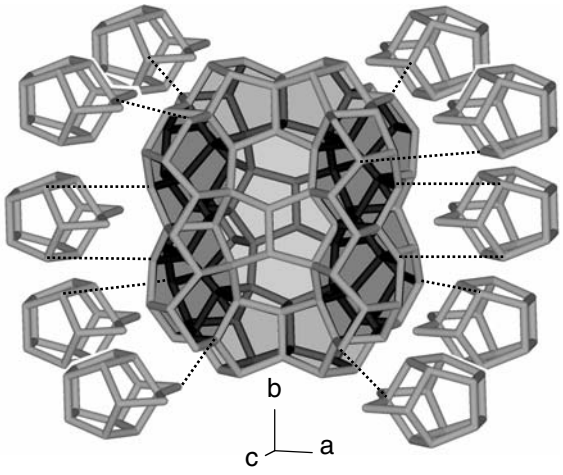


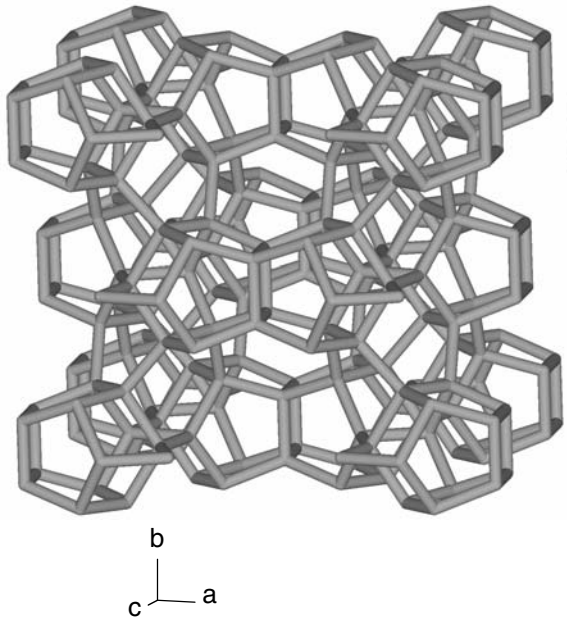
Fig. NON.1.1. The framework structure of NON-type compounds in the highest possible topological symmetry *F m m m*. View parallel **c** rotated by 4° about **a** and **b**.



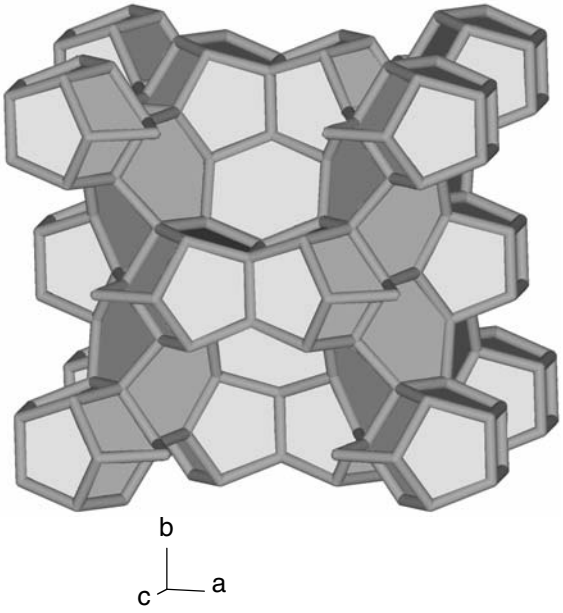
a Linkage of units around the *nns* cage.



b The assemblage shown in a) in semi transparent view extended by *non* units.

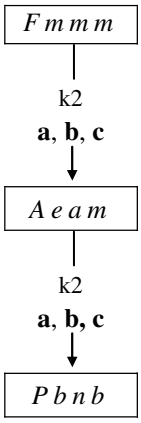


c The complete assemblage shown in b).



d Fig. c) in nontransparent view.

Fig. NON.1.2. The building scheme of NON-type compounds. View parallel **c** rotated by 3° about **a** and **b**.



NON-I. Highest possible topological symmetry observed for 2-aminopentane nonasil.

Splitting of T and O sites reduces space group symmetry.

NON-II. Space group observed for pyr nonasil.

Further splitting of T and O sites reduces space group symmetry, due to 5-coordination of atom Si41.

NON-IV. Space group observed for $CoCp_2F$ nonasil.

Fig. NON.1.2 The Bärnighausen tree illustrating the symmetry relationship of the NON types.

Table NON.1.1 Atomic site relationships of the NON types.

NON-I *F m m m*		NON-II *A e a m*		NON-IV *P b n b*
T1	[32(p), 1]	T11	[16(g), 1]	T11a [8(e), 1]
				T11b [8(e), 1]
		T12	[16(g), 1]	T12a [8(e), 1]
				T12b [8(e), 1]
T2	[16(o), . . *m*]	T21	[8(f), . . *m*]	T21 [8(e), 1]
		T22	[8(f), . . *m*]	T22 [8(e), 1]
T3	[16(n), . *m* .]	T3	[16(g), 1]	T31 [8(e), 1]
				T32 [8(e), 1]
T4	[16(m), *m* . .]	T4	[16(g), 1]	T41 [8(e), 1]
				T42 [8(e), 1]
T5	[8(g), 2 *m m*]	T5	[8(f), . . *m*]	T5 [8(e), 1]
O1	[32(p), 1]	O11	[16(g), 1]	O11a [8(e), 1]
				O11b [8(e), 1]
		O12	[16(g), 1]	O12a [8(e), 1]
				O12b [8(e), 1]
O2	[32(p), 1]	O21	[16(g), 1]	O21a [8(e), 1]
				O21b [8(e), 1]
		O22	[16(g), 1]	O22a [8(e), 1]
				O22b [8(e), 1]

Table NON.1.1 (continued).

NON-I *F m m m*	NON-II *A e a m*	NON-IV *P b n b*
O3 [32(p), 1]	O31 [16(g), 1]	O31a [8(e), 1] O31b [8(e), 1]
	O32 [16(g), 1]	O32a [8(e), 1] O32b [8(e), 1]
O4 [16(o), . . *m*]	O41 [8(f), . . *m*] O42 [8(f), . . *m*]	O41 [8(e), 1] O42 [8(e), 1]
O5 [16(n), . *m* .]	O5 [16(g), 1]	O51 [8(e), 1] O52 [8(e), 1]
O6 [16(l), 2 . .]	O6 [16(g), 1]	O61 [8(e), 1] O62 [8(e), 1]
O7 [8(i), *m m* 2]	O7 [8(d), . . 2]	O7 [8(e), 1]
O8 [8(h), *m* 2 *m*]	O8 [8(f), . . *m*]	O8 [8(e), 1]
O9 [8(e), . . 2/*m*]	O9 [8(f), . . *m*]	O9 [8(e), 1]
O10 [8(d), . 2/*m* .]	O10 [8(e), . 2 .]	O101 [4(c), . 2 .] O102 [4(d), . 2 .]

NON.2 Compounds and crystal data

Table NON.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
NON-I *F m m m*								
NON1986a01	$Si_{88}O_{176} \cdot 4C_5H_{13}N$	19.3	S	-	2-aminopentane	-	-	86Mar1
NON-II *A e a m*								
NON1995a01	$Si_{84}B_4O_{176} \cdot 4C_4H_{10}N$	19.7	S	-	HPyr	-	-	95Mar1
NON-IV *P b n b*								
NON1995b01	$Si_{88}O_{176} \cdot 4CoF(C_5H_5)_2$	19.6	S	-	$(Cp)_2CoF$	-	-	95van1
NON1995c01	$Si_{88}O_{176} \cdot 4CoF(C_5H_5)_2$	19.6	S	-	$(Cp)_2CoF$	-	-	95Beh1

Table NON.2.2 Structural parameters of NON-type compound.

code	*a* [Å]	*b* [Å]	*c* [Å]	*V* [Å^3]	*T* [K]	reference
NON-I ***F m m m***						
NON1986a01	22.232(6)	15.058(4)	13.627(4)	4562	n.s.	86Mar1
NON-II ***A e a m***						
NON1995a01	22.039(4)	14.948(3)	13.573(2)	4471	n.s.	95Mar1
NON-IV ***P b n b***						
NON1995b01	22.125(2)	14.889(2)	13.612(3)	4484	220	95van1
NON1995c01	22.125(2)	14.889(2)	13.612(3)	4484	220	95Beh1

Table NON.2.3 Transformation matrices.

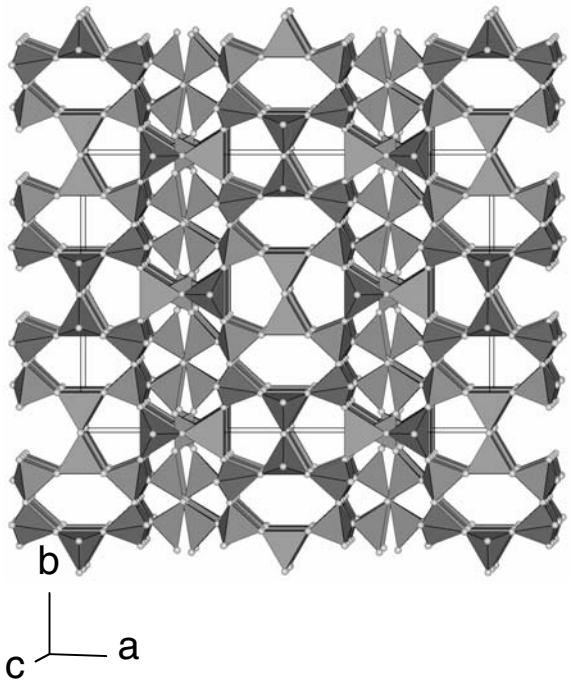
code	shift	matrix	coord. transform.	reference
NON-I ***F m m m***				
NES1996a01	0, 0, 0	**a**, **b**, **c**	*x*, *y*, *z*	86Mar1
NON-II ***A e a m***				
NON1995a01	0, 0, 0	**c**, -**b**, **a**	*z*, -*y*, *x*	95Mar1
NON-IV ***P b n b***				
NON1995b01	½, 0, ½	**a**, -**c**, **b**	*x*-½, -*z*+½, *y*	95van1
NON1995c01	½, 0, ½	**a**, -**c**, **b**	*x*-½, -*z*+½, *y*	95Beh1

NON.3 Framework structures

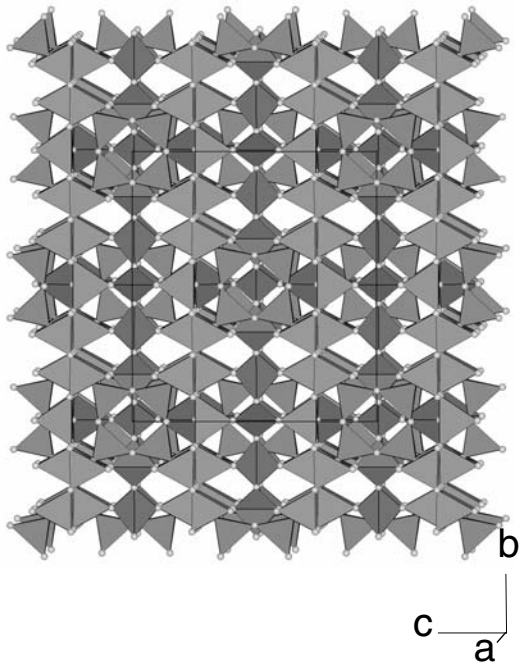
NON.3.1 NON-I compound (*F m m m*, IT #69)

Table NON.3.1.1 Atomic coordinates and site definitions for NON-I, $Si_{88}O_{176} \cdot 4C_5NH_{13}$.(NON1986a01, 86Mar1).

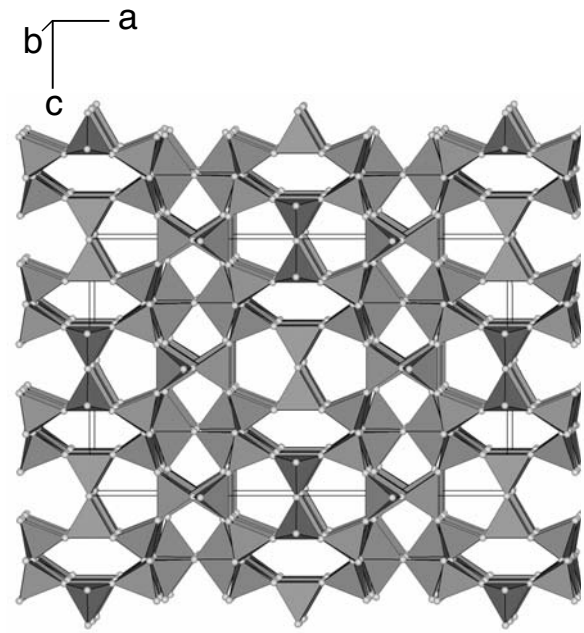
atom	*x*	*y*	*z*	B_{eq} [Å^2]	site symmetry	Wyckoff position	no. of atoms in unit cell
Si1	0.3745(4)	0.1635(7)	0.3103(8)	1.7(2)	1	32(p)	32
Si2	0.2950(7)	0.327(1)	0	2.8(4)	. . *m*	16(o)	16
Si3	0.8173(7)	0	0.283(1)	2.3(3)	. *m* .	16(n)	16
Si4	0	0.6051(9)	0.616(1)	0.3(2)	*m* . .	16(m)	16
Si5	0.280(1)	0	0	2.1(6)	2 *m m*	8(g)	8
O1	0.336(1)	0.328(2)	0.906(2)	5.1(7)	1	32(p)	32
O2	0.4427(8)	0.146(2)	0.337(2)	2.0(6)	1	32(p)	32
O3	0.352(2)	0.405(5)	0.253(4)	10(1)	1	32(p)	32
O4	0.270(3)	0.433(4)	0	13(2)	. . *m*	16(o)	16
O5	0.820(2)	0	0.594(3)	3(1)	. *m* .	16(n)	16
O6	0.367(4)	¼	¼	17(3)	2 . .	16(l)	16
O7	0	0	0.139(4)	2(1)	*m m* 2	8(i)	8
O8	0	0.115(3)	0	0.4(9)	*m* 2 *m*	8(h)	8
O9	¼	¼	0	10(3)	. . 2/*m*	8(e)	8
O10	¼	0	¼	2(1)	. 2/*m* .	8(d)	8
C1	½	0.4489	0.5700	19	*m* . .	16(m)	16
C2	0.4659	0.3547	½	10	. . *m*	16(o)	16
C3	0	0	½	32	*m m m*	4(b)	4



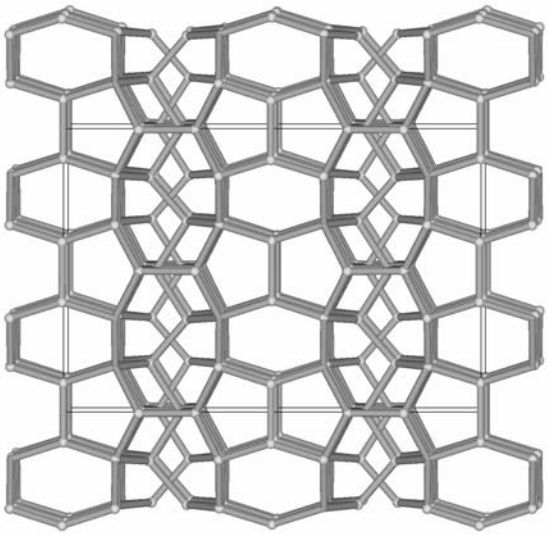
a View parallel **c** rotated by 1° about **a** and **b**.



b View parallel **a** rotated by 1° about **b** and **c**.



c View parallel **b** rotated by 1° about **a** and **c**.



d Ball and stick model corresponding to a).

Fig. NON.3.1.1 Projections of the NON-I crystal structure of $Si_{88}O_{176} \cdot 4C_5H_{13}N$ (NON1986a01, 86Mar1).

Table NON.3.1.2 Selected interatomic distances and angles for NON-I, $Si_{88}O_{176} \cdot 4C_5NH_{13}$. (NON1986a01, 86Mar1).

	T - O [Å]	T - O - T [°]		T - O [Å]	T - O - T [°]
Si1 - O3	1.43(7)	158(4)	Si2 - O9	1.53(2)	180(1)
Si1 - O6	1.55(1)	167(6)	Si2 - O1	1.57(3)	176(2)
Si1 - O1	1.57(3)	176(2)	Si2 - O1	1.57(3)	176(2)
Si1 - O2	1.58(2)	161(2)	Si2 - O4	1.69(6)	151(4)
mean	1.53	166	mean	1.59	171
Si3 - O10	1.56(2)	180(1)	Si4 - O2	1.55(2)	161(2)
Si3 - O3	1.68(7)	158(4)	Si4 - O2	1.55(2)	161(2)
Si3 - O3	1.68(7)	158(4)	Si4 - O8	1.58(2)	169(3)
Si3 - O5	1.68(4)	143(3)	Si4 - O7	1.62(2)	157(4)
mean	1.65	160	mean	1.58	162
Si5 - O4	1.50(6)	151(4)			
Si5 - O4	1.50(6)	151(4)			
Si5 - O5	1.56(4)	143(3)			
Si5 - O5	1.56(4)	143(3)			
mean	1.53	147			

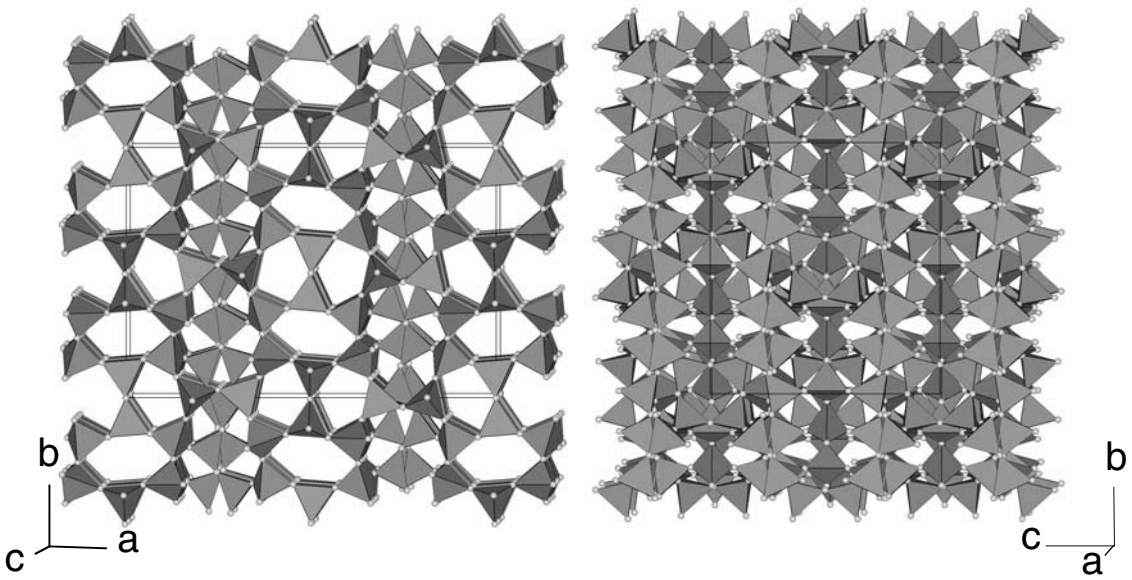
NON.3.2 NON-II compound (*A e a m*, IT #64)

Table NON.3.2.1 Atomic coordinates and site definitions for NON-II, $Si_{84}B_4O_{176} \cdot 4(C_4NH_{10})$ (NON1995a01, 95Mar1).

atom	*x*	*y*	*z*	B_{eq} [Å^2]	site symmetry	Wyckoff position	no. of atoms in unit cell
(Si,B)11	0.3807(1)	0.1635(1)	0.3107(2)	3.23	1	16(g)	15.28 / 0.72
(Si,B)12	0.8677(1)	0.6653(1)	0.3145(2)	3.29	1	16(g)	15.28 / 0.72
(Si,B)21	0.2897(2)	0.2956(2)	0	3.24	. . *m*	8(f)	7.64 / 0.36
(Si,B)22	0.8024(2)	0.8604(2)	0	3.61	. . *m*	8(f)	7.64 / 0.36
(Si,B)3	0.8160(1)	-0.0062(2)	0.2870(2)	3.60	1	16(g)	15.28 / 0.72
(Si,B)4	-0.0050(1)	0.6028(1)	0.6144(2)	3.65	1	16(g)	15.28 / 0.72
(Si,B)5	0.2774(2)	-0.0262(2)	0	3.86	. . *m*	8(f)	7.64 / 0.36
O11	0.3304(4)	0.3021(5)	0.9061(5)	7.15	1	16(g)	16
O12	0.8420(4)	0.8412(4)	0.9070(5)	6.53	1	16(g)	16
O21	0.4520(3)	0.1558(4)	0.3338(6)	5.40	1	16(g)	16
O22	0.9349(3)	0.6422(5)	0.3451(6)	7.16	1	16(g)	16
O31	0.3370(3)	0.4190(4)	0.2337(6)	6.31	1	16(g)	16
O32	0.8621(3)	0.9137(4)	0.2630(5)	4.95	1	16(g)	16
O41	0.2412(4)	0.3721(5)	0	4.83	. . *m*	8(f)	8
O42	0.7822(4)	0.9628(5)	0	4.72	. . *m*	8(f)	8
O5	0.8175(2)	0.0067(4)	0.5962(4)	4.37	1	16(g)	16
O6	0.3702(3)	0.2581(4)	0.2638(6)	5.71	1	16(g)	16
O7	0	0	0.1415(6)	5.80	. . 2	8(d)	8
O8	-0.0019(5)	0.1163(6)	0	5.65	. . *m*	8(f)	8
O9	0.2560(5)	0.2022(5)	0	5.47	. . *m*	8(f)	8
O10	¼	0.0346(6)	¼	4.97	. 2 .	8(e)	8
C1	0	½	0	2.10	. . 2/*m*	4(b)	4
C2	0.048(2)	0.364(3)	0	6.71	. . *m*	8(f)	8

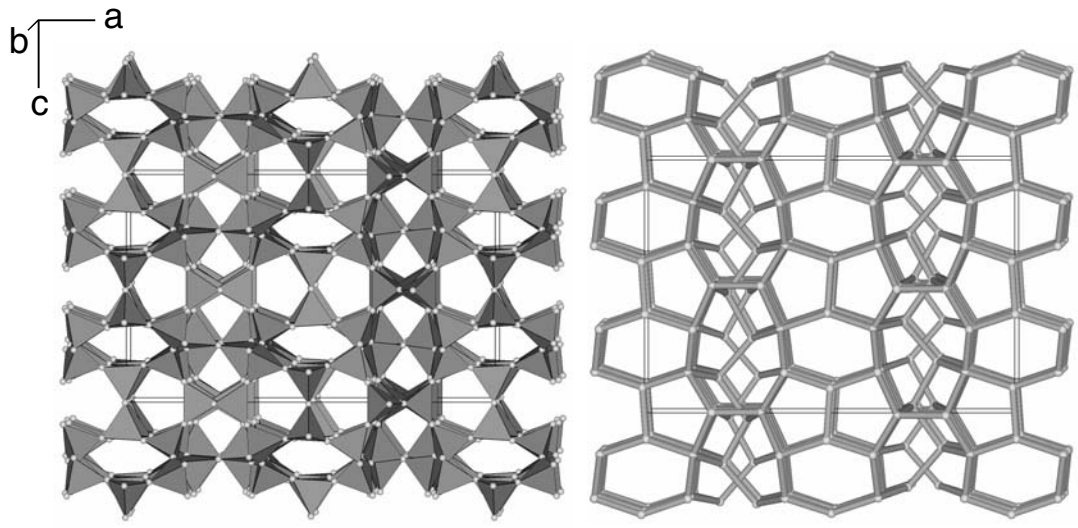
Table NON.3.2.1 (continued)

atom	*x*	*y*	*z*	B_{eq} [Å^2]	site symmetry	Wyckoff position	no. of atoms in unit cell
C3	0.054(2)	0.574(3)	0	7.41	. . *m*	8(f)	8
C4	0.029(1)	0.458(2)	0.098(2)	9.11	1	16(g)	16
C5	0.013(1)	0.650(2)	0.063(2)	7.72	1	16(g)	16



a View parallel **c** rotated by 1° about **a** and **b**.

b View parallel **a** rotated by 1° about **b** and **c**.



c View parallel **b** rotated by 1° about **a** and **c**.

d Ball and stick model corresponding to a).

Fig. NON.3.2.1 Projections of the NON-II crystal structure of $Si_{84}B_4O_{176} \cdot 4C_4H_{10}N$ (NON1995a01, 95Mar1).

Table NON.3.2.2 Selected interatomic distances and angles for NON-II, $Si_{84}B_4O_{176} \cdot 4(C_4NH_{10})$ (NON1995a01, 95Mar1).

	T - O [Å]	T - O - T [°]		T - O [Å]	T - O - T [°]
(Si,B)11 - O12	1.563(8)	171.8(5)	(Si,B)12 - O6	1.564(8)	160.4(6)
(Si,B)11 - O6	1.567(7)	160.4(6)	(Si,B)12 - O11	1.568(8)	165.3(5)
(Si,B)11 - O32	1.582(6)	146.9(4)	(Si,B)12 - O31	1.573(7)	171.6(5)
(Si,B)11 - O21	1.605(7)	148.1(4)	(Si,B)12 - O22	1.576(7)	168.3(6)
Mean	1.579	156.8	mean	1.570	166.4
(Si,B)21 - O11	1.563(8)	165.3(5)	(Si,B)22 - O12	1.561(8)	171.8(5)
(Si,B)21 - O11	1.563(8)	165.3(5)	(Si,B)22 - O12	1.561(8)	171.8(5)
(Si,B)21 - O41	1.565(9)	152.1(6)	(Si,B)22 - O9	1.592(10)	154.0(7)
(Si,B)21 - O9	1.580(9)	154.0(7)	(Si,B)22 - O42	1.594(8)	142.1(6)
Mean	1.568	159.2	mean	1.577	159.9
(Si,B)3 - O31	1.560(7)	171.6(5)	(Si,B)4 - O22	1.552(8)	168.3(6)
(Si,B)3 - O10	1.596(4)	149.2(6)	(Si,B)4 - O8	1.567(3)	164.4(6)
(Si,B)3 - O5	1.598(5)	145.0(4)	(Si,B)4 - O21	1.577(7)	148.1(4)
(Si,B)3 - O32	1.603(6)	146.9(4)	(Si,B)4 - O7	1.584(3)	153.2(6)
Mean	1.589	153.2	mean	1.570	158.5
(Si,B)5 - O41	1.575(8)	152.1(6)			
(Si,B)5 - O5	1.603(6)	145.0(4)			
(Si,B)5 - O5	1.603(6)	145.0(4)			
(Si,B)5 - O42	1.619(9)	142.1(6)			
Mean	1.600	146.1			

NON.3.3 NON-IV compound (*P b n b*, IT #56)

Table NON.3.3.1 Atomic coordinates and site definitions for NON-IV, $Si_{88}O_{176} \cdot 4CoF(C_5H_5)_2$ (NON1995b01, 95van1).

atom	*x*	*y*	*z*	B_{eq} [Å^2]	site symmetry	Wyckoff position	no. of atoms in unit cell
Si11a	0.38294(5)	0.18173(8)	0.3264(1)	0.69	1	8(e)	8
Si11b	0.37504(5)	0.64270(9)	0.79878(9)	0.48	1	8(e)	8
Si12a	0.86497(5)	0.68119(8)	0.3175(1)	0.65	1	8(e)	8
Si12b	0.87446(6)	0.15346(9)	0.8070(1)	0.85	1	8(e)	8
Si21	0.29176(5)	0.30530(8)	0.0137(1)	0.65	1	8(e)	8
Si22	0.79930(5)	0.85259(8)	0.00864(9)	0.65	1	8(e)	8
Si31	0.81559(5)	0.02256(9)	0.29498(9)	0.64	1	8(e)	8
Si32	0.81829(5)	0.47517(9)	0.77972(9)	0.71	1	8(e)	8
Si41	0.00219(6)	0.59583(8)	0.6114(1)	1.03	1	8(e)	8
Si42	-0.00795(6)	0.11077(9)	0.1131(1)	0.97	1	8(e)	8
Si5	0.27899(5)	-0.01855(8)	0.01377(9)	0.63	1	8(e)	8
O11a	0.3250(2)	0.3321(2)	0.9133(3)	1.50	1	8(e)	8
O11b	0.3397(2)	0.8026(2)	0.3986(3)	1.47	1	8(e)	8
O12a	0.8484(2)	0.8268(2)	0.9289(3)	1.53	1	8(e)	8
O12b	0.8267(2)	0.3383(2)	0.3836(3)	1.13	1	8(e)	8
O21a	0.4540(1)	0.1698(2)	0.3417(3)	1.39	1	8(e)	8
O21b	0.4438(2)	0.6502(2)	0.8345(3)	1.55	1	8(e)	8
O22a	0.9320(2)	0.6473(2)	0.3344(3)	1.68	1	8(e)	8

Table NON.3.3.1 (continued)

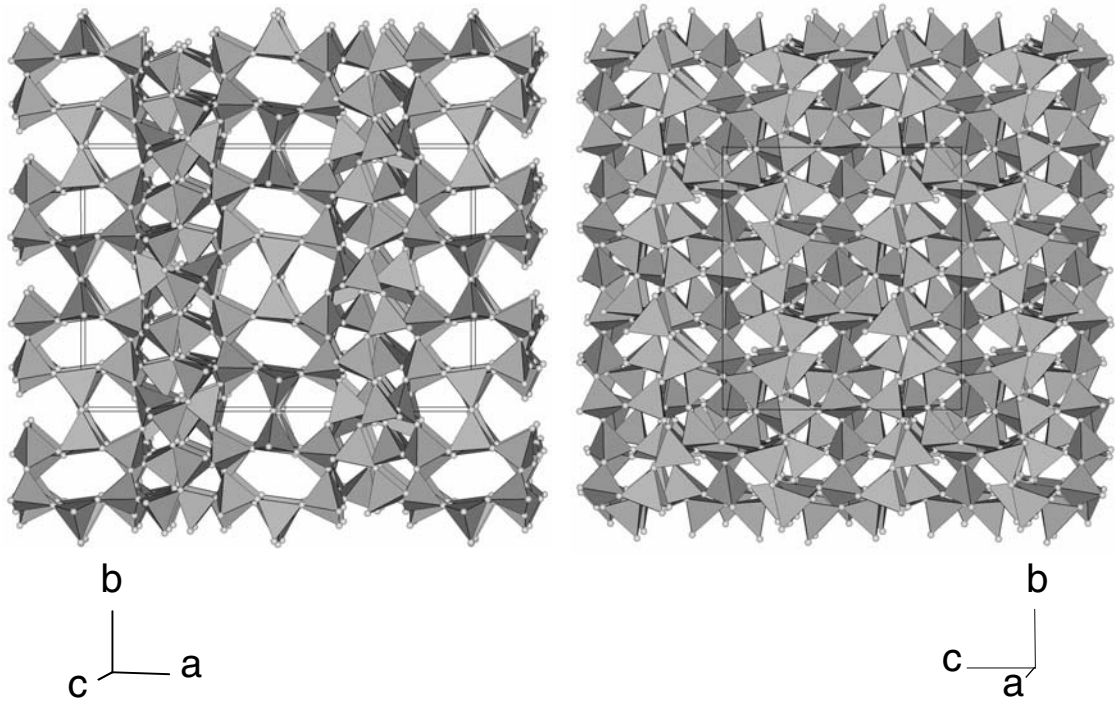
atom	*x*	*y*	*z*	B_{eq} [Å^2]	site symmetry	Wyckoff position	no. of atoms in unit cell
O22b	0.9436(2)	0.1375(3)	0.8289(3)	1.84	1	8(e)	8
O31a	0.3404(2)	0.4381(2)	0.2230(3)	2.08	1	8(e)	8
O31b	0.3356(1)	0.8763(2)	0.7709(2)	0.97	1	8(e)	8
O32a	0.8641(1)	0.9547(2)	0.2489(3)	0.95	1	8(e)	8
O32b	0.8603(2)	0.3917(2)	0.7510(3)	1.53	1	8(e)	8
O41	0.2405(1)	0.3798(2)	0.0346(3)	1.08	1	8(e)	8
O42	0.7801(1)	0.9556(2)	-0.0079(3)	1.13	1	8(e)	8
O51	0.8229(1)	-0.0120(2)	0.6025(2)	0.97	1	8(e)	8
O52	0.8162(2)	0.5105(2)	0.0877(2)	1.18	1	8(e)	8
O61	0.3692(2)	0.2799(2)	0.2847(3)	1.29	1	8(e)	8
O62	0.3640(1)	0.7149(2)	0.7126(3)	1.11	1	8(e)	8
O7	0.0032(2)	0.0081(2)	0.1418(3)	2.74	1	8(e)	8
O8	-0.0133(2)	0.1264(3)	-0.0021(3)	3.03	1	8(e)	8
O9	0.2605(1)	0.2081(2)	0.0038(3)	1.26	1	8(e)	8
O101	¼	0.0483(4)	¼	1.66	. 2 .	4(c)	4
O102	¼	0.4990(3)	¾	1.32	. 2 .	4(d)	4
Co1	0	½	0	1.86	*m* . .	4(b)	4
C1	-0.0326(4)	0.3918(5)	0.9270(6)	4.13	1	8(e)	8
C2	-0.0522(3)	0.3899(5)	0.0244(6)	4.03	1	8(e)	8
C3	-0.0005(4)	0.3865(5)	0.0832(6)	4.24	1	8(e)	8
C4	0.0497(3)	0.3874(5)	0.0230(7)	4.08	1	8(e)	8
C5	0.0310(3)	0.3902(5)	0.9278(6)	3.95	1	8(e)	8
H1	-0.0582	0.3937	0.8692	2.13	1	8(e)	8
H2	0.9063	0.3909	0.0470	4.11	1	8(e)	8
H3	0.0001	0.3839	0.1544	4.03	1	8(e)	8
H4	0.0914	0.3863	0.0449	4.26	1	8(e)	8
H5	0.0570	0.3910	0.8704	4.11	1	8(e)	8
F1	0.5662(3)	0.4518(4)	0.0432(5)	3.95	1	8(e)	4

Table NON.3.3.2 Selected interatomic distances and angles for NON-IV, $Si_{88}O_{176} \cdot 4CoF(C_5H_5)_2$ (NON1995b01, 95van1).

	T - O [Å]	T - O - T [°]		T - O [Å]	T - O - T [°]
Si11a - O21a	1.596(3)	147.5(2)	Si11b - O12b	1.599(4)	153.0(3)
Si11a - O12a	1.596(4)	161.3(3)	Si11b - O21b	1.601(5)	143.5(2)
Si11a - O61	1.597(3)	146.3(3)	Si11b - O32a	1.607(3)	145.9(2)
Si11a - O32b	1.599(4)	150.9(3)	Si11b - O62	1.610(4)	146.1(3)
mean	1.597	151.5	mean	1.604	147.1
Si12a - O22a	1.583(4)	161.6(3)	Si12b - O22b	1.577(5)	155.7(3)
Si12a - O11a	1.588(4)	157.7(2)	Si12b - O61	1.599(4)	146.3(3)
Si12a - O62	1.601(3)	146.1(3)	Si12b - O11b	1.604(4)	152.7(2)
Si12a - O31b	1.613(3)	139.6(2)	Si12b - O31a	1.610(4)	163.6(3)
mean	1.596	151.2	mean	1.597	154.6
Si21 - O11b	1.597(4)	152.7(2)	Si22 - O12a	1.583(4)	161.3(3)
Si21 - O11a	1.602(4)	157.7(2)	Si22 - O12b	1.601(4)	153.0(3)
Si21 - O9	1.610(3)	150.0(2)	Si22 - O42	1.607(3)	141.0(2)
Si21 - O41	1.612(3)	144.1(2)	Si22 - O9	1.611(3)	150.0(2)
mean	1.605	151.1	mean	1.601	151.3

Table NON.3.3.2 (continued)

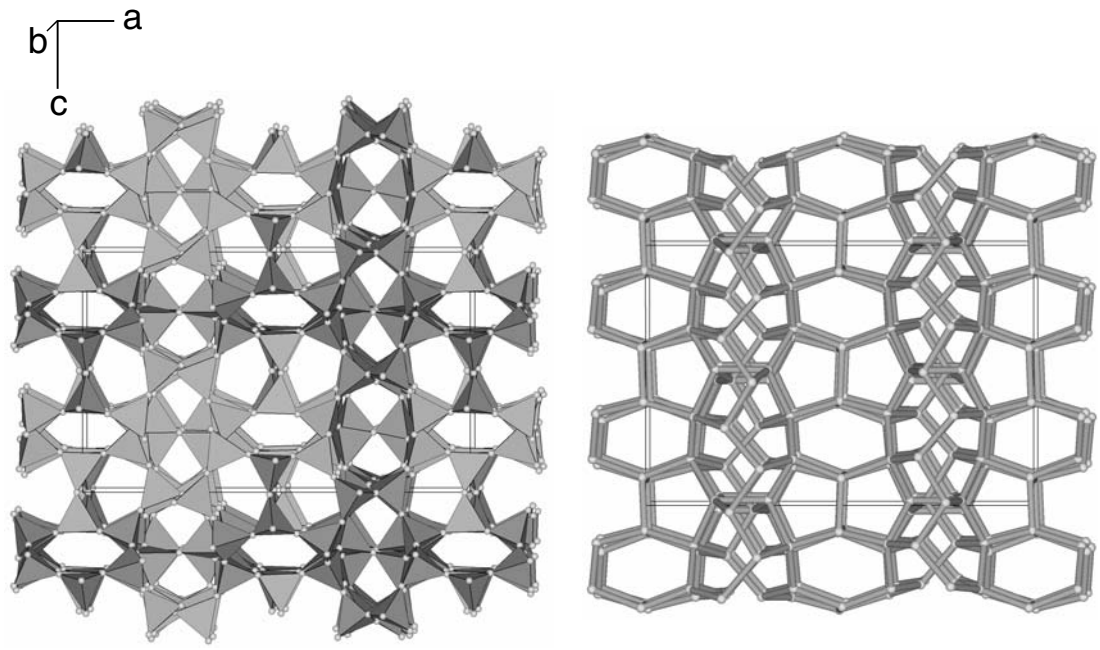
	T - O [Å]	T - O - T [°]		T - O [Å]	T - O - T [°]
Si31 - O32a	1.602(3)	145.9(2)	Si32 - O31a	1.582(4)	163.6(3)
Si31 - O31b	1.603(3)	139.6(2)	Si32 - O32b	1.600(4)	150.9(3)
Si31 - O52	1.607(3)	147.0(3)	Si32 - O101	1.603(2)	154.8(4)
Si31 - O102	1.607(1)	157.0(3)	Si32 - O51	1.618(3)	137.4(2)
mean	1.605	147.4	mean	1.601	151.7
Si41 - O8	1.593(4)	149.7(3)	Si42 - O8	1.590(4)	149.7(3)
Si41 - O7	1.606(3)	148.0(3)	Si42 - O7	1.597(3)	148.0(3)
Si41 - O21b	1.620(4)	143.5(2)	Si42 - O22a	1.604(4)	161.6(3)
Si41 - O22b	1.651(5)	155.7(3)	Si42 - O21a	1.605(3)	147.5(2)
mean	1.618	149.2	mean	1.599	151.7
Si5 - O41	1.599(3)	144.1(2)			
Si5 - O42	1.611(3)	141.0(2)			
Si5 - O52	1.612(3)	147.0(3)			
Si5 - O51	1.612(3)	137.4(2)			
mean	1.609	142.4			



a View parallel **c** rotated by 1° about **a** and **b**.

b View parallel **a** rotated by 1° about **b** and **c**.

Fig. NON.3.3.1 Projections of the NON-IV crystal structure of $Si_{88}O_{176} \cdot 4CoF(C_5H_5)_2$ (NON1995b01, 95van1).



c View parallel **b** rotated by 1° about **a** and **c**.

d Ball and stick model corresponding to a).

Fig. NON.3.3.1 (continued) Projections of the NON-IV crystal structure of $Si_{88}O_{176} \cdot 4CoF(C_5H_5)_2$ (NON1995b01, 95van1).

NON.4 Chemical composition

	D																
H																	He
Li	Be											**B**	**C**	**N**	***O***	**F**	Ne
Na	Mg											Al	**Si**	P	S	Cl	Ar
K	Ca	Sc	Ti	V	Cr	Mn	Fe	**Co**	Ni	Cu	Zn	Ga	Ge	As	Se	Br	Kr

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

NON.5 Flexibility and apertures

There is insufficient information available about the NON-type to judge its flexibility.

There are no openings larger than 6-rings in the framework of NON-type.

NON.6 Other information

Table NON.6.1 Angles around atom Si41 in NON-IV, $Si_{88}O_{176} \cdot 4CoF(C_5H_5)_2$ (NON1995b01, 95van1).

	O - T - O [°]			O - T - O [°]
O8 - Si41 - O7	120.0(2)	O7	- Si41 - O22b	100.2(2)
O8 - Si41 - O21b	116.1(2)	O7	- Si41 - F1	79.4(2)
O8 - Si41 - O22b	100.6(2)	O21b	- Si41 - O22b	99.7(2)
O8 - Si41 - F1	78.7(3)	O21b	- Si41 - F1	81.6(3)
O7 - Si41 - O21b	114.8(2)	O22b	- Si41 - F1	178.7(3)

Catalytic properties have not been reported for NON-type compounds. However, the facility of the NON-framework to host a variety of compounds in its pores has attracted attention. Nonasil has been synthesized, among others, with N,N,N-trimethylisopropylammonium hydroxide, N,N,N-trimethylcyclopentylammonium hydroxide, N,N,N-trimethylcyclohexylammonium hydroxide, and N,N,N-trimethylnorbornylammonium hydroxide [98Sha1]. Nonasil with cobalticinium fluoride [95Beh1] in its pores ([Cp_2Co]-F-[Si-NON]) exhibits electric field-induced second harmonic generation [99Mar1].

Silicon atom Si41 has in addition to the four oxygen atoms listed in Table NON.3.3.2 another neighbor, an F atom at a distance of 1.836(7) Å. This has been shown by the crystal structure determination [95Beh1, 95van1] and by MAS-NMR [99Mar1].

NON.7 References

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