Framework-Type Determination for Zeolite Structures in the Inorganic Crystal Structure Database

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In this work a structural characterization of zeolite crystals is performed by identifying the framework type to which each zeolite belongs. The framework type is assigned for 1433 zeolite database entries in the FIZ/NIST Inorganic Crystal Structure Database (ICSD) populating 95 framework types. These entries correspond to both natural and synthetic zeolites. Each ICSD entry is based on published work containing crystallographic information of the zeolite crystalline structure and some physical and chemical data. Today, the Structure Commission of the International Zeolite Association recognizes crystalline materials as belonging to the "zeolite" family only if they possess one of the approved framework types by the organization. Such information is of fundamental importance for identifying zeolites, for reference, for zeolite standards, for supporting the discovery of new zeolites, and for crystalline substance selection based on application. Unfortunately, framework-type information is not contained in the ICSD records. The long term goal of this work is filling such gap. Although the ICSD contains an extensive collection of zeolites, inclusion of zeolites belonging to the 191 accepted framework types could substantially expand such collection. The structural determination was achieved via several structural analysis methods based on numerical-computer implementations. © *2010 by the U.S. Secretary of Commerce on behalf of the United States. All rights reserved.*. [doi:10.1063/1.3432459]

Key words: zeolite; crystallography; framework type code; ICSD; Inorganic Crystal Structure Database.

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1. Introduction

Zeolites are microporous crystalline materials with regular structures consisting of molecular-sized pores and channels. Zeolites occur naturally [2001BIS/MIN], as product of synthesis, and millions of hypothetical zeolites not yet synthesized are continuously proposed [2009FOS/TRE]. Both natural and synthetic zeolites are widely used in the fields of adsorption, ion-exchange, heterogeneous catalysis (most of today's gasoline is produced through zeolitic catalytic processes), energy storage, and more recently in several emerging fields such as health and medicine [2003PAY/DUT]. These applications are strongly contingent upon the underlying framework topologies of zeolites. For such reason, the classification scheme based on crystal structure has become today the standard for identifying zeolites from other zeolitic materials such as quartz and feldspars that display tetrahedral framework structures. Zeolitelike materials occur both in nature and as products of synthetic processes. From earlier definitions by Hey [1930HEY] or Smith [1988SMI], the term zeolite was restrictive to aluminosilicates. Since then the definition has been extended to include in the underlying framework other types of T-atoms (elements tetrahedrally coordinated to oxygen atoms) and interrupted frameworks [1998COO/ALB]. To alleviate miscommunication between different science communities, the subcommittee on zeolite minerals of the International Mineralogical Association, Commission on New Minerals and Mineral Names proposed a revised definition of a zeolite [1998COO/ALB]:

A zeolite mineral is a crystalline substance with a structure characterized by a framework of linked tetrahedra, each consisting of four O atoms surrounding a cation. This framework contains open cavities in the form of channels and cages. These are usually occupied by H_2O *molecules and extra-framework cations that are commonly exchangeable. The channels are large enough to allow the passage of guest species. In the hydrated phases, dehydration occurs at temperatures mostly below about* 400 °C *and is largely reversible. The framework may be interrupted by (OH, F) groups; these occupy a tetrahedron apex that is not shared with adjacent tetrahedra.*

This more specific view excludes from the family of zeolites those crystalline materials possessing frameworks with channels that are too restrictive for allowing molecular sieving, reversible dehydration, or cation exchange. Therefore, cancrinites, feldspars, feldspathoids, melanophlogite, and scapolites are excluded from the zeolite family [2001BIS/MIN, 1998COO/ALB]. The Structure Commission of the International Zeolite Association (IZA-SC) [2009BAE/MCC] has adopted a universal code of three capital letters for identifying different framework types of zeolites. This structurally based classification scheme is widely used and essential for applications. As of 2009, there are 191 distinct zeolite framework types [2009BAE/MCC] and this number has increased steadily in the last decade; it was 133 in 2001 according to the 5th ed. of Atlas of Zeolite Framework Types [2001BAE/MEI].

The FIZ/NIST Inorganic Crystal Structure Database

(ICSD)[1] [2009ICS, 2002BEL/HEL] contains an extensive collection of zeolite crystal structures, all collected from peer-reviewed publications. Despite its size and uniqueness, the database only gathers a fraction of all discovered zeolites. The ICSD includes records of natural and synthetic zeolites providing comprehensive crystallographic information for each entry. However, the database does not contain the structural characterization coded in the framework type of zeolites. Therefore, the goal of our work is the determination of the framework-type code (FTC) for all the zeolite entries in the ICSD. This paper is organized as follows. Section 2 gives a description of the processing of data entries in the database, the structural analysis performed, and provides a table of entries which need more attention in zeolite structural characterization, and may not have enough information for FTC assignment. These zeolitic entries may or not belong to the family of zeolites, and for them an "assigned" or "expected" FTC is provided. Assigned FTC implies that we are certain about the determination based on several computational methods. Expected FTC implies that according to literature and to experimental process used to prepare that zeolite sample, there is expectation that the sample would have that FTC although we cannot determine it by computational methods. Section 3 contains the bulk of this paper in which the framework type was univocally assigned for 1370 zeolite entries and reported in ten tables. This work is concluded in Secs. 4 and Sec. 5 provides all references cited in the paper and tables.

2. Data Processing

In the ICSD data set made available by the National Institute of Standards and Technology to the George Mason University team, there are 1648 entries populating the mineral-group "zeolite." These entries span 289 distinct mineral names and 822 distinct chemical names. In this work *zeolite* refers to any ICSD entry possessing one of the 191 framework topologies approved by IZA-SC. Some zeolitelike entries in the ICSD are not zeolites upon our analysis, as described below.

Systematic data review and structure analysis were performed for the 1648 zeolite candidate entries in the ICSD. Three steps were followed: (i) data verification showed that 175 entries need further attention from the database producers concerning eventual typographical errors, missing atoms in the reduced unit cell, or unspecified mineral information for clearly identifying their structure. These database records are reported elsewhere [2009YAN/LAC] and were removed from the data set on which structure analysis was performed. (ii) The underlying frameworks of 1473 crystalline structures were generated based on the symmetry information of the asymmetric unit cell contained in the database records. By doing so, atoms in the cation and adsorbent portions of the chemical formula were removed from the structural analysis. The bare framework contains only T-atoms and oxygen atoms tetrahedrally coordinated to them forming TO_4 building units of the network. (iii) All T–T and T–O bond lengths in the bare underlying framework of these 1473 structures were checked to verify that they have acceptable values for allowing TO_4 tetrahedral coordination. Values of T–O bond lengths span a 1.58–1.78 Å range [1988SMI] and T–T edge lengths are within a few percents of 3.1 Å in regular zeolites. A softer criterion for T–O bond lengths of 1.35–2.20 Å was adopted in our analysis.

As a result of the above-described three-step process, we identified 1370 entries as normal zeolite structures and 103 entries as "expected zeolites" with their structures significantly disordered from the regular TO_4 networks typical of zeolites. IZA researchers have created a dynamic catalog containing 22 different types of structural disorder found in zeolites [2009BAE/MCC]. Underlying framework disorder manifests when T–T and T–O bond lengths are outside the allowed length range, occupation probabilities of T-atom sites are smaller than one, rotations of TO_4 units result in network faults. For example, ICSD-67667 [1992LI/GU] is a ZSM-5-type alumnosilicate expected to have MFI framework type. However, some T–O bond lengths in its underlying framework are 2.3–2.4 Å long, clearly outside the range 1.58–1.78 Å in normal zeolites. Another example is ICSD-63218 [1988PEC] where calculation of T–O bond lengths from the structural data in the database gives distances as short as 0.4 Å. These bonds are fictitious and they do not really exist. In fact, the positions read from the database correspond to sites of T and O atoms in the network that are not simultaneously occupied (either T or O fill one of the two close sites, in which case the other site at 0.4 Å should be left empty). In this case, the database entry contains warning comments noting that the disordered structure "cannot adequately be described by the numerical parameters" and that the structure is associated with twinning. Evidence of disorder in the zeolite framework pertaining to short T–T edge lengths is found in several entries, e.g., 1.7–2.0 Å in ICSD-30279 [1933TAY/MEE] and 0.8–1.0 Å in ICSD-200951 [1978ALB/RIN]. These short edge lengths are associated with distances between T sites along the framework that should not be simultaneously occupied. However, the occupation probability for the two T sites in the database is 1. This is indicative of a potential error in the values of site occupancy probabilities entered in the database or typographical error in the original publication. Disorder pertaining to empty T sites in the framework (total occupancy probability of T sites is less than 1) is found in ICSD-54076 [1982PEC] where several T sites have occupancy probability of 0.5. This is a disorder type in which there are vacancies in T-atom sites along the backbone network.

The structural determination of the 1473 entries was

[1]The central focus of this work is a systematic and comprehensive demonstration of proof of concept and not a database evaluation. Accordingly, certain commercial materials, i.e., a scientific database+internal reference codes, are identified in this paper to fully specify experimental procedures and results. The reference codes are provided only for the convenience of the reader. Substantially similar information may be obtained from other sources not referenced herein. NIST explicitly does not endorse any particular product or service of any provider, nor is it intended to imply that the materials identified are necessarily the best available for the purpose.

achieved via several structural analysis methods based on numerical-computer implementations. For the set of 1370 entries associated with normal zeolites, the structural determination of the framework type was done using the ZEOTSITES program [2001SAS/GAL] to determine coordination sequences (CSs) [1979MEI/MOE] and vertex symbols (VSs) [1997OKE/HYD]. This determination was rechecked with the TOPOS program [2006BLA] by additionally obtaining the tiling and transitivity information of each framework type. To complete the analysis, tiling information was fed to the SYSTRE/3DT program [2005DEL/OKE] for determining the complexity of each framework type. Complexity of any crystalline structure is identified by the Delaney symbol (D-sym) [1987DRE]. Once obtained, a thorough comparison of the combined CS-VS information with the standard table of framework types from IZA-SC [2009BAE/MCC] was performed. These entries and the determined FTC are reported in Sec. 3.

A more involved determination of the CS-VS-tiling transitivity was encountered for the 103 entries catalogued as expected zeolites. Details for these 103 zeolite entries are given in Table 1, which contains the ICSD collection number, mineral name, chemical formula, our assigned and confirmed FTC for 63 entries, our expected FTC (but not confirmed) for 40 entries determined from declarations in the ICSD records, and the original bibliographic reference. The FTC for 63 entries was confirmed based on two methodologies. First, the battery of conventional structure-determining programs [2001SAS/GAL, 2006BLA, 2005DEL/OKE, 2005DEL/FOS] was used to determine framework types for the 103 entries. However, most of these methods failed for a good number of entries. Structure inquiry from TOPOS [2006BLA] was the most robust and consistent allowing determination of CS-VS-tiling-transitivity information for 42 entries out of the 103. These results are reported in the fourth column of Table 1 (value to the right). The second method is the framework-type predictor (FTP), a recently developed machine learning model for assigning framework type to zeolites. The FTP serves as an alternative to the conventional method and is not based on sequence of bond lengths [2009YAN/LAC2, 2009YAN/LAC3]. For that reason, the FTC is very effective for predicting framework types of disordered zeolites where the traditional method often fails. Framework-type assignment with the FTP was done on the subset of 103 entries yielding assignment for 59 of them as reported in the fourth column of Table 1 (value to the left). These 59 FTC assignments coincided with the expected FTCs, thus giving confirmation to the assignment process.

Combining results from both traditional methods (TOPOS) and the machine learning FTP method, we are able to confirm the framework type for 63 of the 103 disordered zeolite entries. The remaining 40 entries (out of 103) reported in Table 1 (fifth column) appear to be zeolites according to their expected FTCs based on the original publication. However, none of the existing structural analysis methods could confirm a framework type for them.

In summary, our data processing ensures 1370 ICSD entries with confirmed FTCs according to IZA CS-VS-tiling transitivity. These entries with regular zeolite structures populating 94 distinct known zeolite framework types are reported in Sec. 3, Tables 2–11. Additionally, a set of 103 entries of disordered structures is reported in Table 1 with confirmed FTC assignment for 63 of them based on state-of-the-art methods. In this group of disordered zeolites there is one entry belonging to the CHI framework type that is not found in the 94 populated by normal zeolites. All together, in this work we have assigned framework type to 1433 zeolite entries. The original publication where each zeolite was analyzed experimentally is given in the last column of all tables.

TABLE 1. List of 103 entries in the ICSD with geometrical disorder out of which the framework type of zeolites is confirmed for 63 of them

ICSD code	Mineral name	Chemical formula	Assigned FTP/TOPOS	Expected FTC	Reference
60891	Zeolite A	$Li(AlSiO_4)(D_2O)$	–/–	ABW	1986NOR/NOR
91680	Zeolite AlPO-53	$(Al_{24}(PO_4)_{24})(CH_3NH_2)_8(H_2O)_{16}$	–/AEN		2000KIR/GRO
91681	Zeolite AlPO-53	$Al(PO_4)$	–/–	AEN	2000KIR/GRO
42382	Zeolite APO-14	$((C_3H_7)NH_3)(Al_{3.957}Cr_{0.043})(PO_4)_4(OH)(H_2O)$	–/–	AFN	1993HEL/KAU
42383	Zeolite APO-14	$((C_3H_7)NH_3)(Al_{3.95}Cr_{.05})(PO_4)_4(OH)(H_2O)$	–/–	AFN	1993HEL/KAU
97105	Tschernichite	$Ca_{8.66}(Al_{17.32}Si_{46.68}O_{128})(H_2O)_{37.12}$	–/–	BEA	2002ALB/CRU
153254	Zeolite beta	$Si_{64}O_{128}$	–/–	BEA	2005MAR/PER
89055	Brewsterite	$(Sr_{1.54}Ba_{0.53})(Al_{4.05}Si_{11.95})O_{32}(H_2O)_{3.16}$	BRE[a]/–		1999ALB/SAC
91699	Brewsterite	$(Ba_{0.51}Sr_{1.49})(Al_4Si_{12}O_{32})(H_2O)_{0.79}$	BRE[a] /BRE[a]		2000SAC/VEZ
91700	Brewsterite	$(Ba_{0.51}Sr_{1.49})(Al_4Si_{12}O_{32})(H_2O)_{2.88}$	BRE[a]/–		2000SAC/VEZ
93955	Brewsterite	$(Ba_{0.274}Sr_{1.838})(Al_4Si_{12}O_{32})O_{0.194}(H_2O)_{9.788}$	BRE[a]/–		2001ALB/VEZ
31264	Chabazite	$(Na_{1.45}Ca_{1.03}K_{0.38}Sr_{0.07}Ba_{0.02}Mg_{0.01}Fe_{0.01})(Si_{7.90}Al_{4.10})O_{24}(H_2O)_{12.57}$	CHA/CHA		1983MAZ/GAL
37148	Chabazite	$Ca_2(Al_4Si_8O_{24})(H_2O)_{12}$	CHA/–		1933WYA
80917	Chiavennite	$CaMn(Be_2Si_5O_{13}(OH)_2)(H_2O)_2$	CHI/CHI		1995TAZ/DOM

TABLE 1. List of 103 entries in the ICSD with geometrical disorder out of which the framework type of zeolites is confirmed for 63 of them—Continued

ICSD code	Mineral name	Chemical formula	Assigned FTP/TOPOS	Expected FTC	Reference
31383	Dachiardite	$Ca_{2.76}K_{0.62}Al_{4.86}Si_{18.96}O_{48}(H_2O)_{12}$	DAC[a]/DAC[a]		1984VEZ
82992	Zeolite UTD-1	SiO_2	–/–	DON	1996FRE/TSA
83861	Zeolite UTD-1	$Si_{64}O_{128}$	–/–	DON	1997LOB/TSA2
201588	Zeolite E	$Na_{7.96}(Al_{10.8}Si_{25.2}O_{72})$	EAB/EAB		1984CAR/MEI
172576	Zeolite TNU-7	$Na_{12.4}(Ga_{12.4}Si_{47.6}O_{120})$	EON/EON		2006HAN/CHI
16995	Epistilbite	$(Ca_{2.59}Na_{1.06}K_{0.1})((Al_{6.29}Si_{17.71})O_{48})(H_2O)_{15.74}$	–/EPI		1967PER
29539	Epistilbite	$Na_{.95}Ca_{2.85}(Al_6Si_{18}O_{48})(H_2O)_{14}$	EPI/–		1985ALB/GAL
172075	Estilbite	$Ca_{1.94}(Al_{2.904}Si_{9.096})O_{24}$	EPI/EPI		2003CRU/MAR
1234	Erionite	$K_{1.6}Ca_2(Na_{0.9}Mg_{0.7}Ca_{0.4})(Al_{9.1}Si_{26.9}O_{72})$	ERI/–		1977SCH/PLU2
6273	Zeolite X	$Tl_{88}(Al_{88}Si_{104}O_{384})$	FAU/FAU		1974DEB/MAX
24868	Faujasite	$(NH_4)_{5.92}Al_{66.43}Si_{139}O_{399.05}H_{36.89}$	FAU/FAU		1971MAH/HUN
24869	Faujasite	$H_{7.7}Al_{42.56}Si_{139}O_{345.6}$	FAU/FAU		1971MAH/HUN
24870	Faujasite high	$Al_{60.352}Si_{139}O_{371.52}H_{5.984}$	FAU/FAU		1971MAH/HUN
33601	Zeolite Y	$Na_{0.86}H_{6.14}Al_7Si_{17}O_{48}$	FAU/FAU		1971GAL/IME
41394	Zeolite Y	$(Al_{1.31}Al_{1.87}Si_{9.61}O_{24})_{.93}$	FAU/FAU		1989JEA/AOU
41395	Zeolite Y	$(Al_{1.79}Al_{.5}Si_{10.25}O_{24})_{.96}$	FAU/FAU		1989JEA/AOU
41396	Zeolite Y	$(Al_{.62}Al_{.27}Si_{11.33}O_{24})_{.9}$	FAU/FAU		1989JEA/AOU
41397	Zeolite Y	$(Al_{1.48}Al_{1.57}Si_{9.65}O_{24})_{.92}$	FAU/FAU		1989JEA/AOU
41398	Zeolite Y	$(Al_{1.28}Al_{1.93}Si_{9.63}O_{24})_{.81}$	FAU/FAU		1989JEA/AOU
88547	Zeolite X	$Na_{54}(D_3O)_{42}(Si_{96}Al_{96}O_{384})(D_2O)_{80}$	FAU/FAU		1999ZHU/SEF
92902	Faujasite	$Na_{56}(Al_{56}Si_{136}O_{384})$	FAU/FAU		2001YON/BUS
99718	Zeolite X	$(Cs_{45.3}Na_{46.7})(Al_{92}Si_{100}O_{384})$	FAU/FAU		2004RYU/BAE
81507	Ferrierite	$(Si_{18}O_{36})(C_5H_5N)_{1.92}(C_3H_7(NH_2))_{0.427}$	–/–	FER	1996WEI/GAB
92388	Ferrierite-Na	$Na_{4.26}(Al_{4.26}Si_{31.74}O_{72})$	FER/FER		2000KAT/ITA
92389	Ferrierite-Na	$Na_{3.53}(Al_{3.53}Si_{32.47}O_{72})$	FER/FER		2000KAT/ITA
31279	Heulandite	$Ca_{2.16}Al_{9.48}Si_{26.61}O_{72}(H_2O)_{25.5}H_{5.15}$	HEU/–		1983ALB/VEZ
38400	Heulandite	$Ca_{4.52}Al_{9.04}Si_{26.96}O_{72}(H_2O)_{13.4}$	HEU/HEU		1984HAM/TAY
73412	Clinoptilolite	$(Na_{0.48}Ca_{0.392})_4(Ba_{0.08}K_{0.14})_4Mg_{0.72}(Al_{6.96}Si_{29.04}O_{72})(H_2O)_{24.4}$	HEU/–		1993ARM
97917	Heulandite	$Cd_{5.33}(Al_{8.7}Si_{27.3}O_{72})$	HEU/HEU		2003DOE/ARM2
95480	Zeolite JBW	$Na_3(Al_3Ge_3O_{12})(H_2O)_2$	–/–	JBW	2002TRI/PAR
40885	Zeolite A	$(N(C_4H_9)_4)H_7(Si_8O_{20})(H_2O)_{5.33}$	–/–	LTA	1987BIS/LIE
51681	Zeolite LTA	$Na_{5.5}(Si_{0.5}Al_{0.5})_{12}O_{24}(PbI_2)_{1.84}$	LTA/–		2001TOG/SAK
83356	Zeolite LTA	$Ca(Al_2Si_2O_8)$	–/–	LTA	1996DIM/DON
87729	Zeolite A	$Na_{12}(AlSiO_4)_{12}$	LTA/LTA		1999LEE/CHO
89906	Zeolite LTA	$K_{128.74}(Si_{96.96}Al_{95.04}O_{384})$	LTA/LTA		2000IKE/KOD
150095	Zeolite Linde Type A	$K_{41.6}K_{96}(Si_{96.96}Al_{95.04}O_{384})$	LTA/LTA		2004IKE/KOD
202304	Zeolite 5A	$((AlO(OH)_3)_{6.24}H_{12.35}Ca_{40}Na_{16}(Al_{96}Si_{96}O_{384}))(CO)_{40}$	LTA/LTA		1987ADA/HAS
74172	Zeolite L	$K_{2.52}(Al_{10.68}Si_{27.36}O_{72})(H_2O)_{25.5}$	LTL/–		1992HIR/KAT
66077	Zeolite ZSM-11	$Na_{1.68}H_{6.32}(Ga_8Si_{88}O_{192})$	MEL/MEL		1990LIU/LIA
83332	Zeolite ZSM-11	SiO_2	MEL/MEL		1996HOC/MAR
88901	Merlinoite	$Na_{4.72}K_{7.28}(Al_{12}Si_{20}O_{64})(H_2O)_{24.24}$	–/–	MER	1999YAK/MAS
34370	Silicalite	SiO_2	MFI/MFI		1978FLA/BEN
65788	Zeolite H-ZSM-5	$(Si_{24}O_{48})((CH_3)_2(C_6H_4))_2$	MFI/–		1989VAN/TUI
66648	Zeolite ZSM-5	$H_{1.22}(Si_{94.43}Al_{1.57}O_{192})(H_2O)_{16}$	MFI/–		1992LI/GU
67667	Zeolite ZSM-5	$H_{1.61}(Si_{94.22}Al_{1.78}O_{192})(H_2O)_{24}$	MFI/–		1992LI/GU
68734	Zeolite H-ZSM-5	$Si_{12}O_{24}$	MFI/–		1990VAN
91693	Silicalite	$(Ti_{2.48}Si_{93.52})O_{192}$	MFI/–		2000MAR/ART
93536	Zeolite TS-1	$(Ti_{0.025}Si_{0.9433})O_2$	MFI/MFI		2001HEN/WEL
93537	Zeolite TS-1	$Si_{0.9717}O_2$	MFI/MFI		2001HEN/WEL
93538	Zeolite TS-1	$(Ti_{0.0233}Si_{0.9308})O_2$	MFI/MFI		2001HEN/WEL

TABLE 1. List of 103 entries in the ICSD with geometrical disorder out of which the framework type of zeolites is confirmed for 63 of them—Continued

ICSD code	Mineral name	Chemical formula	Assigned FTP/TOPOS	Expected FTC	Reference
93539	Zeolite TS-1	$(Ti_{0.0167}Si_{0.9483})O_2$	MFI/MFI		2001HEN/WEL
203221	Zeolite H-ZSM-5	$(Si_{24}O_{48})(C_6H_4Cl_2)_2$	MFI/–		1996VAN/JAN2
153334	Zeolite COK-5	$Si_{72}O_{144}$	–/–	MFS	2005KIR/BON
153335	Zeolite COK-5	$Si_{72}O_{144}$	–/–	MFS	2005KIR/BON
153336	Zeolite COK-5	$Si_{144}O_{288}$	–/–	MFS	2005KIR/BON
4394	Mordenite	$Na_{.014}Al_{.1646}Si_{.8354}O_2H_{0.16}$	–/–	MOR	1975MOR/PLU2
75278	Maricopaite	$Pb_{7.49}Ca_{2.31}(Al_{11.6}Si_{36.4}O_{100})(H_2O)_{19}$	MOR/–		1994ROU/PEA
98840	Mordenite	$K_{2.77}Ca_{1.86}Na_{1.90}(Al_{7.89}Si_{40.15}O_{96})(H_2O)_{28.72}$	–/–	MOR	2004SIM/ARM
98841	Mordenite	$Na_{5.5}(Al_6Si_{42}O_{96})(H_2O)_{19.44}$	MOR/–		2004SIM/ARM
99717	Mordenite	$Na_{6.68}Se_{9.82}(Al_{5.99}Si_{41.96}O_{96})(H_2O)_{9.87}$	MOR/–		2004SIM/ARM2
20057	Gonnardite	$Na_2Ca(Al_2Si_3O_{10})_2(H_2O)_6$	–/–	NAT	1972AMI/ASR
30278	Natrolite	$Na_2(Al_2Si_3O_{10})(H_2O)_2$	NAT/–		1933TAY/MEE
63218	Paranatrolite	$Na_2Al_2Si_3O_{10}(H_2O)_3$	–/–	NAT	1988PEC
67210	Natrolite	$Na_2(Al_{1.92}Si_{2.08})SiO_{10.04}(H_2O)_{1.96}$	NAT/–		1989PEC
8291	Offretite	$K_{1.04}Ca_{1.04}Mg_{0.98}(Al_{5.1}Si_{12.9}O_{36})(CO)_{0.88}$	–/–	OFF	1976MOR/PLU3
8292	Offretite	$K_{1.03}CaMgAl_{5.03}Si_{12.97}O_{36}$	–/–	OFF	1976MOR/PLU2
30918	Partheite	$Ca_2(Al_4Si_4O_{15}(OH)_2)(H_2O)_4$	–/–	PAR	1984ENG/YVO
31016	Roggianite	$Ca_{16}(Al_{16}Si_{32}O_{88}(OH)_{16})(OH)_{16}(H_2O)_{16.48}$	–/–	PAR	1980GAL
51637	Phillipsite	$Mg_{2.44}K_{0.52}(Al_{6.3}Si_{9.7}O_{32})(H_2O)_{16}$	–/–	PHI	2001GUA
75209	Pahasapaite	$Ca_6Li_{12}(Be_{24}P_{24}O_{96})$	RHO/RHO		1994PAR/COR
71349	Roggianite	$Ca_2(Be(OH)_2Al_2Si_4O_{13})(H_2O)_{2.34}$	–/–	RON	1991GIU/MAZ
86548	Zeolite RUB-3	SiO_2	–/–	RTE	1995MAR/GRU
86549	Zeolite RUB-3	SiO_2	–/–	RTE	1995MAR/GRU
31200	Stilbite	$Na_{5.97}(NH_4)_{5.48}(Al_{9.34}Si_{26.13}O_{72})$	–/STI		1983MOR
63232	Stilbite	$Na_{1.6}Ca_4(Al_9Si_{27}O_{72})(H_2O)_{31.52}$	–/–	STI	1987QUA/VEZ
83470	Stilbite	$Na_{16.75}Ca_{5.48}(Al_{17.27}Si_{54.40}O_{148.56})(H_2O)_{5.84}$	STI/STI		1997CRU/ART
200951	Stellerite B	$Si_{28.04}Al_{7.96}Ca_{2.82}Na_{0.38}O_{72}(H_2O)_{1.28}H_{1.94}$	–/STI		1978ALB/RIN
201868	Barrerite	$Ca_{7.36}(Al_{16.99}Si_{55.01}O_{144})(H_2O)_{72.4}$	STI/STI		1984SAC/GOM
85468	Zeolite SSZ-31	$Si_{28}O_{56}$	–/–	STO	1997LOB/TSA
85469	Zeolite SSZ-31	$Si_{56}O_{112}$	–/–	STO	1997LOB/TSA
85470	Zeolite SSZ-31	$Si_{56}O_{112}$	–/–	STO	1997LOB/TSA
85471	Zeolite SSZ-31	$Si_{56}O_{112}$	–/–	STO	1997LOB/TSA
85472	Zeolite SSZ-31	$Si_{56}O_{112}$	–/–	STO	1997LOB/TSA
85473	Zeolite SSZ-31	$Si_{112}O_{224}$	–/–	STO	1997LOB/TSA
85474	Zeolite SSZ-31	$Si_{56}O_{112}$	–/–	STO	1997LOB/TSA
85475	Zeolite SSZ-31	$Si_{112}O_{224}$	–/–	STO	1997LOB/TSA
30279	Thomsonite	$NaCa_2(Al_5Si_5O_{20})(H_2O)_6$	–/–	THO	1933TAY/MEE
54076	Thomsonite	$Na_{1.95}Ca_{2.65}(Al_{3.91}Si_{3.91}O_{17.31})(H_2O)_{9.49}$	–/–	THO	1982PEC
56478	Zeolite DAB-2	$(H_2(GaPO_4)_4F_2)(C_6H_{12}N_2)$	–/–	ZON	1997MED/GRO

[a]Removed artificial short T–T contacts.

3. Framework Types of Zeolite Entries in the ICSD

The distribution of the 1370 confirmed zeolite entries among different framework types is far from uniform, ranging from 1 to 351 entries per framework type. This distribution is shown in Fig. 1, where the framework types are ordered by decreasing number of zeolite entries belonging to the given framework type. The right scale of the plots gives the D-symbol for every framework type. Note that number of entries in each FTC and its complexity are not correlated.

3.1. Zeolite framework types populated with 63 or more entries ($n \geqslant 63$)

There are six most populated framework types in the ICSD (FAU, LTA, HEU, NAT, RHO, and CHA), each possessing 63 or more entries ($n \geqslant 63$). They are listed in Tables 2–7.

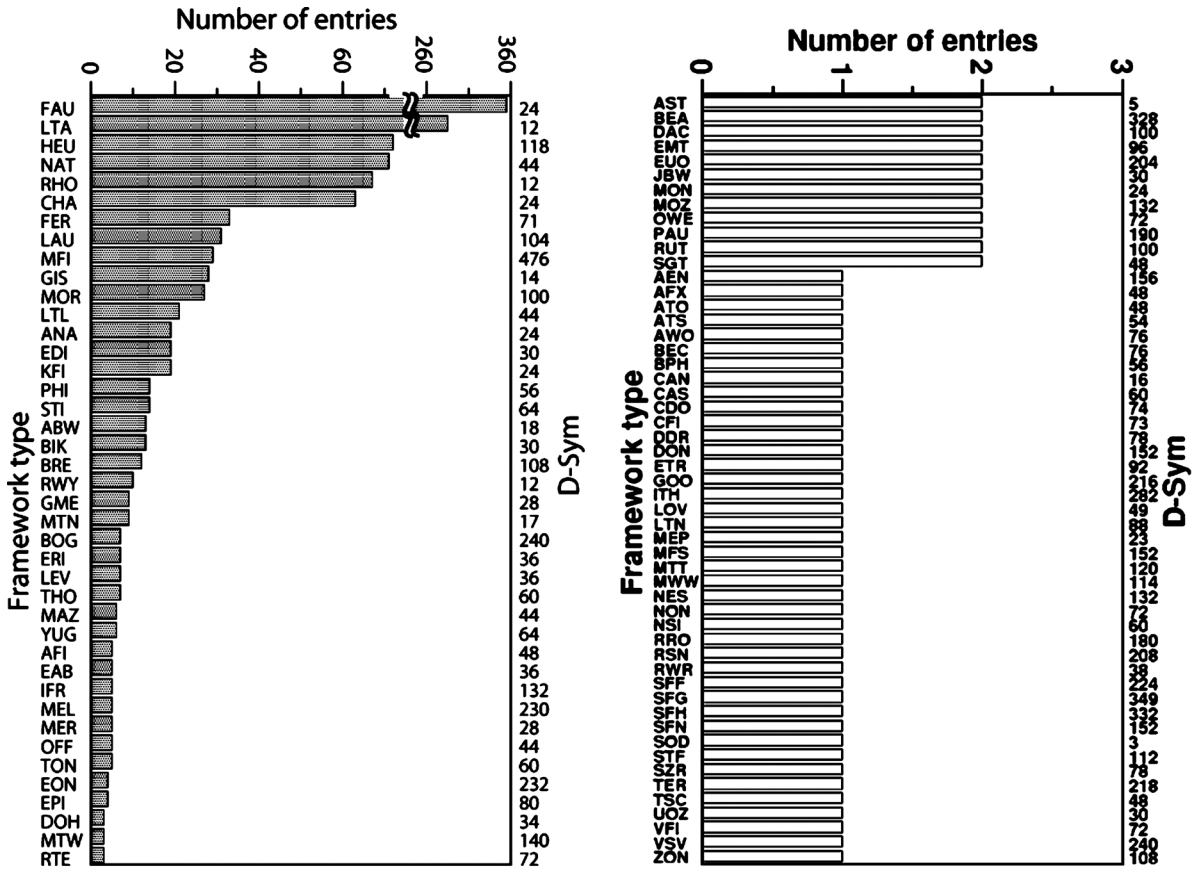

FIG. 1. Distribution of the 1370 confirmed zeolites entries in the Inorganic Crystal Structure Database in 94 distinct framework types. Left scale gives the framework-type code and right scale gives the Delaney symbol corresponding to each framework type.

3.2. Zeolite Framework types with population 19 ≤n≤33

The next group of framework types based on population in the ICSD encompasses nine framework types with population ranging from 19 to 33 (19≤n≤33). These entries are collectively listed in Table 8.

3.3. Zeolite framework types with population 6≤n ≤14

In decreasing order of populated framework types, the next group contains 14 distinct framework types, each populated with 6–14 entries in the ICSD (6≤n≤14). These zeolite entries are collectively listed in Table 9.

3.4. Zeolite framework types with population 3≤n ≤5

The fourth group of ICSD zeolite entries populates 12 distinct framework types, each populated with three to five entries (3≤n≤5) and collectively listed in Table 10.

3.5. Zeolite framework types with population 1≤n ≤2

The least populated group of framework types includes 53 framework types, each possessing only one or two entries (1≤n≤2). There are only 65 zeolite entries in this group that are collectively listed in Table 11.

TABLE 2. List of 351 zeolite entries belonging to the framework-type FAU

ICSD code	Mineral name	Chemical formula	FTC	Reference
4392	Faujasite	$Cu_{.146}(AlO_2)_{.292}(SiO_2)_{.708}(H_2O)_{.747}$	FAU	1975MAX/DE
6315	Zeolite X	$Na_{88}(Al_{88}Si_{104}O_{384})(H_2O)_{172.1}$	FAU	1970OLS
9007	Faujasite	$Cu_{.146}(AlO_2)_{.292}(SiO_2)_{.708}(H_2O)_{.0276}$	FAU	1975MAX/DE
9355	Faujasite	$Ca_{28}(Al_{57}Si_{135}O_{384})$	FAU	1968BEN/SMI3
9446	Faujasite	$Ca_{43.3}Al_{76.8}Si_{115.2}O_{384}$	FAU	1972PLU/SMI
9521	Zeolite X	$Ca_{40}Al_{80}Si_{112}O_{384}(H_2O)_{116}$	FAU	1973PLU/SMI
9605	Zeolite X	$Na_{11}Fe_{10}(Si_{151}Al_{41})O_{384}(H_2O)_{164}$	FAU	1976EVM/BEA
9798	Zeolite X	$Na_{64}Al_{54}Si_{138}O_{384}Te_5$	FAU	1972OLS/MIK

TABLE 2. List of 351 zeolite entries belonging to the framework-type FAU—Continued

ICSD code	Mineral name	Chemical formula	FTC	Reference
20731	Zeolite X	$Na_{4.43}Al_6Si_6O_{24}(H_2O)_{6.3}$	FAU	1983SMO/SHE
20732	Zeolite X	$Na_{17.52}Al_{24}Si_{24}O_{96}H_{6.48}$	FAU	1983SMO/SHE
20927	Zeolite X; sodian	$Na_{92}Al_{92}Si_{100}O_{384}(H_2O)_{100.8}$	FAU	1983SMO/SHE
22278	Zeolite 13Y	$Na_{57}Si_{135}Al_{57}O_{384}$	FAU	1967EUL/SHO
22279	Zeolite 13Y	$K_{57}Si_{135}Al_{57}O_{384}$	FAU	1967EUL/SHO
22280	Zeolite 13Y	$Ag_{57}Si_{135}Al_{57}O_{384}$	FAU	1967EUL/SHO
24867	Faujasite	$Na_{5.12}Al_{52.35}Si_{139}O_{362.88}(OH)_{32}H_{39.594}$	FAU	1971MAH/HUN
26920	Faujasite	$H_{59}(AlO_2)_{59}(SiO_2)_{133}$	FAU	1969OLS/DEM
28079	Zeolite Y	$(NH_4)_{41.3}La_{6.9}Al_{62}Si_{130}O_{384}(H_2O)_{6.8}$	FAU	1975SCH/BAS
28080	Zeolite Y	$La_{20.7}Al_{62}Si_{130}O_{384}(H_2O)_{34.2}$	FAU	1975SCH/BAS
28249	Faujasite	$Na_{18.24}Ce_{5.76}Al_{35.52}Si_{156.48}O_{384}(H_2O)_{57.28}$	FAU	1968OLS/KOK
28250	Faujasite	$Na_{7.28}Ce_{5.76}Al_{24.56}Si_{71.44}O_{192}(H_2O)_8$	FAU	1968OLS/KOK
28251	Zeolite X	$La_{8.25}Al_{21.745}Si_{26.23}O_{96}(OH)_8H_5$	FAU	1968OLS/KOK
28252	Zeolite X	$La_{7.52}Al_{21.60}Si_{26.4}O_{96}(H_2O)_8$	FAU	1968OLS/KOK
28504	Faujasite	$Ca_5Ni_{24}Al_{58}Si_{134}O_{384}(H_2O)_{7.68}$	FAU	1968OLS
28508	Faujasite	$Na_{18.24}Ca_{11.74}Ce_{5.76}(Al_{59}Si_{133}O_{384})(H_2O)_{57.28}$	FAU	1967OLS/KOK
31541	Zeolite Y	$Na_{0.66}H_{2.84}Al_{3.5}Si_{8.5}O_{24}$	FAU	1974GAL/BEA
31542	Zeolite Y	$Na_{0.36}H_{1.3}Al_{1.66}Si_{10.34}O_{24}$	FAU	1974GAL/BEA
33589	Zeolite Y	$Na_{13.4}La_9(La(OH))_{7.3}Al_{55}Si_{137}O_{384}(H_2O)_{270}$	FAU	1967SMI/BEN
33590	Zeolite Y	$Na_{13.4}La_{16.3}Al_{55}Si_{137}O_{388}(H_2O)_{270}$	FAU	1967SMI/BEN
33599	Zeolite Y	$Na_{3.475}H_{3.525}Al_7Si_{17}O_{48}$	FAU	1971GAL/IME
33600	Zeolite Y	$Na_{2.16}H_{4.84}Al_7Si_{17}O_{48}$	FAU	1971GAL/IME
33604	Zeolite Y	$(NH_4)_{39.5}K_{15.2}Al_{54.7}Si_{137.3}O_{384}(H_2O)_{190}$	FAU	1973MOR/COS
34097	Zeolite X	$(Na_{1.2}O)(Al_2Si_{2.8}O_{7.8})(OH)_{0.8}$	FAU	1960BRO/SHO
34277	Zeolite NaY	$Na_{51}Al_{51}Si_{141}O_{384}(H_2O)_{7.83}$	FAU	1977MAR/SOR
34329	Faujasite	$La_{1.3}(Al_4Si_{12}O_{32})$	FAU	1968BEN/SMI
34330	Faujasite	$Ca_{0.731}Si_6O_{12.731}(H_2O)_{0.894}$	FAU	1968BEN/SMI2
34331	Faujasite	$La_{13.6}Al_{41.28}Si_{150.72}O_{384}(H_2O)_{46.9}$	FAU	1969BEN/SMI
34364	Faujasite	$La_{25.68}Al_{76.8}Si_{115.2}O_{384}$	FAU	1969BEN/SMI3
34365	Faujasite	$(La_{15.9}H_9)Si_{138.1}Al_{53.9}O_{385.4}$	FAU	1968BEN/SMI
34396	Faujasite	$(Na_2Ca)_{0.225}H_{0.3}(Al_{1.2}Si_{2.8}O_8)$	FAU	1958BER/BAU
34807	Faujasite	$(Na_{0.1805}Ca_{0.0278})((Al_{0.3}Si_{0.7})O_2)(H_2O)_{0.222}$	FAU	1964BAU
36206	Faujasite manganese	$Mn_{28.5}Si_{135}Al_{57}O_{384}(H_2O)_{27.2}$	FAU	1969SIM/STE2
37449	Faujasite	$La_{1.3}Al_4Si_{12}O_{32}$	FAU	1969BEN/SMI2
40138	Zeolite Y	$((C_3H_7)NH_3)_{18.8}K_{35.9}Al_{54.7}Si_{137.3}O_{384}(H_2O)_{101}$	FAU	1973MOR/COS
40139	Zeolite Y	$((C_2H_5)NH_3)_{23.4}K_{31.3}Al_{54.7}Si_{137.3}O_{384}(H_2O)_{111}$	FAU	1973MOR/COS
40140	Zeolite Y	$((CH_3)NH_3)_{27.5}K_{27.3}Al_{54.7}Si_{137.3}O_{384}(H_2O)_{124}$	FAU	1973MOR/COS
40509	Zeolite Y	$Pd_{12}Na_{17}H_{14.9}Si_{136.1}Al_{55.9}O_{384}$	FAU	1983BER/TRI
40510	Zeolite Y	$Pd_{10.6}Na_{12.6}H_{43.3}Si_{136.1}Al_{55.9}O_{384}$	FAU	1983BER/TRI
40511	Zeolite Y	$Pd_{9.8}Na_{12.9}H_{34.8}Si_{136.1}Al_{55.9}O_{384}$	FAU	1983BER/TRI
40512	Zeolite Y	$Pd_{13.8}Na_{8.7}H_{47.2}Si_{136.1}Al_{55.9}O_{384}$	FAU	1983BER/TRI
40513	Zeolite Y	$Pd_{12.9}Na_{8.4}H_{47.5}Si_{136.1}Al_{55.9}O_{384}$	FAU	1983BER/TRI
40518	Zeolite NaX	$Na_{92}Al_{92}Si_{100}O_{384}(C_6H_6)_5$	FAU	1988SHE/AND
40927	Zeolite Y	$Na_{57.7}Al_{57.7}Si_{134.3}O_{384}$	FAU	1986FIT/JOB
40928	Zeolite Y	$Na_{55.5}Al_{55.5}Si_{136.5}O_{384}(C_6D_6)_{7.7}$	FAU	1986FIT/JOB
40929	Zeolite Y	$Na_{52.4}Al_{52.4}Si_{139.6}O_{384}(C_6D_6)_{24.77}$	FAU	1986FIT/JOB
40931	Faujasite	$Na_{87}(Ga_{87}Si_{105}O_{384})$	FAU	1986NEW/JAC
40932	Faujasite	$Na_{80}(Ga_{80}Si_{112}O_{384})$	FAU	1986NEW/JAC
40933	Faujasite	$Na_{58}(Ga_{58}Si_{134}O_{384})$	FAU	1986NEW/JAC
49553	Zeolite Y	$Si_{.7276}Al_{.2724}O_2(Al(OH)_4)_{.0068}$	FAU	1984PAR/COR
49554	Zeolite Y	$Si_{.9016}Al_{.0984}O_2(Al(OH)_4)_{.00365}$	FAU	1984PAR/COR
49555	Zeolite Y	$Si_{.9016}Al_{.0984}O_2(Al(OH)_4)_{.00365}$	FAU	1984PAR/COR
54223	Zeolite X	$K_{90.1}(Al_{92}Si_{100}O_{384})$	FAU	2001ZHU/SEF
54855	Zeolite NaY	$Na_{60.8}(Si_{141}Al_{51}O_{384})(ND_3)_{12.86}$	FAU	2004GIL/BLI
55474	Zeolite Y	$Si_{192}O_{384}$	FAU	2004COL/FOR
55475	Zeolite Y	$Si_{192}O_{384}(H_2O)_{43.47}$	FAU	2004COL/FOR

TABLE 2. List of 351 zeolite entries belonging to the framework-type FAU—Continued

ICSD code	Mineral name	Chemical formula	FTC	Reference
55476	Zeolite Y	$Si_{192}O_{384}(H_2O)_{43.90}$	FAU	2004COL/FOR
55477	Zeolite Y	$Si_{192}O_{384}(H_2O)_{47.70}$	FAU	2004COL/FOR
55478	Zeolite Y	$Si_{192}O_{384}(H_2O)_{70.72}$	FAU	2004COL/FOR
55479	Zeolite Y	$Si_{192}O_{384}(H_2O)_{74.56}$	FAU	2004COL/FOR
55480	Zeolite Y	$Si_{192}O_{384}(H_2O)_{92.48}$	FAU	2004COL/FOR
55481	Zeolite Y	$Si_{192}O_{384}(H_2O)_{92}$	FAU	2004COL/FOR
55482	Zeolite Y	$Si_{192}O_{384}(H_2O)_{100.32}$	FAU	2004COL/FOR
55483	Zeolite Y	$Si_{192}O_{384}(H_2O)_{101.12}$	FAU	2004COL/FOR
55484	Zeolite Y	$Si_{192}O_{384}(H_2O)_{103.68}$	FAU	2004COL/FOR
55485	Zeolite Y	$Si_{192}O_{384}(H_2O)_{106.40}$	FAU	2004COL/FOR
55486	Zeolite Y	$Si_{192}O_{384}$	FAU	2004COL/FOR
55487	Zeolite Y	$Si_{192}O_{384}$	FAU	2004COL/FOR
55488	Zeolite Y	$Si_{192}O_{384}$	FAU	2004COL/FOR
55489	Zeolite Y	$Si_{192}O_{384}$	FAU	2004COL/FOR
55490	Zeolite Y	$Si_{192}O_{384}$	FAU	2004COL/FOR
55491	Zeolite Y	$Si_{192}O_{384}$	FAU	2004COL/FOR
55949	Zeolite X	$Ag_{92}(Si_{100}Al_{92}O_{384})$	FAU	2003KIM/KIM
55950	Zeolite X	$Ag_{86}(Si_{100}Al_{92}O_{384})$	FAU	2003KIM/KIM
56801	Zeolite Y	$(Na_{54.72}(Al_{54.72}Si_{137.28})O_{384})(C_4H_8Br_2)_{0.35}$	FAU	1993KAS/JON
56802	Zeolite Y	$(Na_{53.12}(Al_{53.12}Si_{138.88})O_{384})(C_4H_8Br_2)_{2.45}$	FAU	1993KAS/JON
61187	Zeolite Y	$Co_{14}Na_{25}H_3Al_{56}Si_{136}O_{384}$	FAU	1974GAL/IME
61188	Zeolite Y	$Co_{14}Na_{25}H_3Al_{56}Si_{136}O_{384}$	FAU	1974GAL/IME
61189	Zeolite Y	$Co_{19}Na_{18}Al_{56}Si_{136}O_{384}$	FAU	1974GAL/IME
61190	Zeolite Y	$Co_{19}Na_{18}Al_{56}Si_{136}O_{384}$	FAU	1974GAL/IME
61700	Zeolite Y	$Cu_{17.5}Na_{20.48}(Al_{56.06}Si_{135.94}O_{384})$	FAU	1972GAL/BEN
61701	Zeolite Y	$(Cu_{14.2}Na_{17.8}(Al_{56}Si_{136}O_{384}))(NH_3)$	FAU	1972GAL/BEN
62098	Zeolite X	$Cd_{48.96}Si_{104}Al_{88}O_{384}(H_2O)_{232.64}$	FAU	1986CAL/NAR
64731	Faujasite	$Ni_{28.9}Si_{133}Al_{59}O_{384}(H_2O)_{24}$	FAU	1969SIM/STE
65488	Zeolite Y	$Sr_{26.88}Si_{136.5}Al_{55.5}O_{384}$	FAU	1987VAN/MOR
65489	Zeolite Y	$Sr_{26.56}Si_{136.5}Al_{55.5}O_{384}$	FAU	1987VAN/MOR
65490	Zeolite Y	$Sr_{26.24}Si_{136.5}Al_{55.5}O_{384}$	FAU	1987VAN/MOR
65491	Zeolite Y	$Sr_{26.24}Si_{136.5}Al_{55.5}O_{384}$	FAU	1987VAN/MOR
65492	Zeolite Y	$Sr_{26.56}Si_{136.5}Al_{55.5}O_{384}$	FAU	1987VAN/MOR
65493	Zeolite Y	$Sr_{11.20}Si_{136.5}Al_{55.5}O_{384}(H_2O)_{40}$	FAU	1987VAN/MOR
65494	Zeolite Y	$Sr_{21.44}Si_{136.5}Al_{55.5}O_{384}(H_2O)_{36.48}$	FAU	1987VAN/MOR
65495	Zeolite Y	$Sr_{26.24}Si_{136.5}Al_{55.5}O_{384}(H_2O)_{34.88}$	FAU	1987VAN/MOR
65496	Zeolite Y	$Sr_{26.08}Si_{136.5}Al_{55.5}O_{384}(H_2O)_{16.64}$	FAU	1987VAN/MOR
65499	Zeolite X	$Na_7Gd_{27}(Al_{88.11}Si_{103.9}O_{384})(H_2O)_{195}$	FAU	1987CAL/BAC2
65500	Zeolite X	$Na_{88}(Al_{88}Si_{104}O_{386})(H_2O)_{194.54}$	FAU	1987CAL/BAC
65624	Zeolite X	$Ca_{47.04}(Al_{96}Si_{96}O_{384})(H_2O)_{119}$	FAU	1989SMO/SHE
65625	Zeolite X	$Ca_{40.32}(Al_{96}Si_{96}O_{384})(H_2O)_{32}$	FAU	1989SMO/SHE
65626	Zeolite X	$Ca_{46.1}(Al_{96}Si_{96}O_{384})(H_2O)_{10.9}$	FAU	1989SMO/SHE
65627	Zeolite X	$Ca_{44.6}(Al_{96}Si_{96}O_{384})(H_2O)_{9.28}$	FAU	1989SMO/SHE
65628	Zeolite X	$Ca_{49.1}(Al_{96}Si_{96}O_{384})$	FAU	1989SMO/SHE
65629	Zeolite X	$Ca_{39.36}(Al_{96}Si_{96}O_{384})(H_2O)_{60.64}$	FAU	1989SMO/SHE
66100	Zeolite X	$Li_{17.28}Na_{30.72}(Al_{92}Si_{100}O_{384})(H_2O)_{69.06}$	FAU	1990SHE/AND
66101	Zeolite X	$Li_{41.28}Na_{24.32}(Al_{92}Si_{100}O_{384})(H_2O)_{8.64}$	FAU	1990SHE/AND
66102	Zeolite X	$Mg_{19.2}Na_{26.88}(Al_{92}Si_{100}O_{384})(H_2O)_{106.24}$	FAU	1990AND/SHE
66103	Zeolite X	$Mg_{25.28}Na_{31.34}(Al_{92}Si_{100}O_{384})$	FAU	1990AND/SHE
66104	Zeolite X	$Ca_{18.56}Mg_{8.64}(Al_{92}Si_{100}O_{384})(H_2O)_{109.44}$	FAU	1990AND/SHE
66105	Zeolite X	$Ca_{23.20}Mg_{22.4}(Al_{92}Si_{100}O_{384})$	FAU	1990AND/SHE
66138	Zeolite LZ210	$Na_{21.82}H_{10.5}(Al_{32.5}Si_{159.5}O_{384})$	FAU	1989VAN/DHA
66139	Zeolite KY	$K_{54.7}(Al_{54.7}Si_{137.3}O_{384})(H_2O)_{50.08}$	FAU	1989VAN/DHA
66140	Zeolite KGaY	$K_{55.8}(Al_{55.8}Si_{136.2}O_{384})(H_2O)_{278}$	FAU	1989VAN/DHA
66158	Zeolite X	$K_{54.08}Na_{13.44}(Al_{96}Si_{96}O_{384})(H_2O)_{110.4}$	FAU	1991SHE/BUT
66159	Zeolite X	$K_{57.44}Na_{42.76}(Al_{96}Si_{96}O_{384})$	FAU	1991SHE/BUT
66160	Zeolite X	$Rb_{35.2}Na_{31.36}(Al_{96}Si_{96}O_{384})(H_2O)_{134.56}$	FAU	1991SHE/BUT

TABLE 2. List of 351 zeolite entries belonging to the framework-type FAU—Continued

ICSD code	Mineral name	Chemical formula	FTC	Reference
66161	Zeolite X	$Cs_{39.36}Na_{40.8}(Al_{96}Si_{96}O_{384})(H_2O)_{164.48}$	FAU	1991SHE/BUT
66162	Zeolite X	$Cs_{44.8}Na_{54.4}(Al_{96}Si_{96}O_{384})$	FAU	1991SHE/BUT
66409	Zeolite Y	$Na_{13.93}D_{44.7}(Al_{56}Si_{136}O_{384})(D_2O)_{15.15}$	FAU	1992CZJ/JOB
66410	Zeolite Y	$Na_{6.28}D_{44.23}(Al_{56}Si_{136}O_{384})$	FAU	1992CZJ/JOB
66411	Zeolite Y	$Na_3H_{53.17}(Al_{56}Si_{136}O_{384})$	FAU	1992CZJ/JOB
66475	Zeolite NaLZ210	$Na_{31.2}H_{1.8}(Al_{32.5}Si_{159.5}O_{384})$	FAU	1992LIE/MOR2
66476	Zeolite NaECR32	$Na_{24.8}H_{7.7}(Al_{32.5}Si_{159.5}O_{384})$	FAU	1992LIE/MOR2
66477	Zeolite NaHY6	$Na_{14.1}H_{14.1}(Al_{28.2}Si_{163.8}O_{384})$	FAU	1992LIE/MOR2
66478	Zeolite NaHY10	$Na_{8.48}H_{10.6}(Al_{17.6}Si_{174.4}O_{384})$	FAU	1992LIE/MOR2
66479	Zeolite NaHY21	$Na_{4.5}H_{4.5}(Al_{9.1}Si_{182.9}O_{384})$	FAU	1992LIE/MOR2
67095	Zeolite X	$Ag_{74.24}H_{17.3}Si_{100.5}Al_{91.5}O_{384}(H_2O)_{78.72}$	FAU	1989BUT/SHE
67096	Zeolite X	$Ag_{82.4}H_{9.1}Si_{100.5}Al_{91.5}O_{384}$	FAU	1989BUT/SHE
67097	Zeolite X	$Ag_{73.92}H_{17.6}Si_{100.5}Al_{91.5}O_{384}(H_2O)_{114.24}$	FAU	1989BUT/SHE
67098	Zeolite X	$Cs_{39.36}Na_{40.80}H_{11.8}Si_{100}Al_{92}O_{384}(H_2O)_{164.48}$	FAU	1989BUT/SHE2
67099	Zeolite X	$Cs_{46.76}Na_{49.12}Si_{96.12}Al_{95.88}O_{384}$	FAU	1989BUT/SHE2
68632	Zeolite KY	$K_{34.9}(Al_{34.9}Si_{157.1}O_{390.8})$	FAU	1988MOR/VAU
68633	Zeolite KY	$K_{32.5}(Al_{32.5}Si_{159.5}O_{393.6})$	FAU	1988MOR/VAU
68634	Zeolite KY	$K_{13.38}(Al_{13.25}Si_{178.75}O_{391.17})$	FAU	1988MOR/VAU
68635	Zeolite KY	$K_{20.19}((NH_4)_{39.5}Al_{49.15}Si_{142.85}O_{390.1})$	FAU	1988MOR/VAU
67649	Zeolite Y	$Na_{.09}Zn_{.1028}(Al_{.28}Si_{.72}O_2)(OH)_{.1367}$	FAU	1992WIL/CHE
71287	Zeolite Y	$Na_{55}(Al_{55}Si_{137}O_{384})(C_8D_{10})_{9.144}$	FAU	1991CZJ/FUE
71288	Zeolite Y	$Yb_{15.94}Na_{10.18}(Al_{55}Si_{137}O_{384})(OH)_{3.18}(H_2O)_{15.25}(C_8D_{10})_{4.848}$	FAU	1991CZJ/FUE
71289	Zeolite Y	$Yb_{14.976}Na_{10.176}(Al_{55}Si_{137}O_{384})(OH)_{0.2}(H_2O)_{19.0}(C_8D_{10})_{10.704}$	FAU	1991CZJ/FUE
71438	Zeolite Y	$Yb_{14}Na_{13}(Al_{55}Si_{137}O_{384})(H_2O)_{20.928}(C_6D_5(ND_2))_{12}$	FAU	1991CZJ/VOG
72062	Zeolite Y	$Na_{57.28}H_{1.12}(Si_{133.6}Ga_{58.4}O_{384})$	FAU	1992LIE/MOR
72063	Zeolite Y	$Na_{37.12}(NH_4)_{21.28}(Si_{133.6}Ga_{58.4}O_{384})$	FAU	1992LIE/MOR
72064	Zeolite Y	$Na_{25.6}(NH_4)_{32.8}(Si_{133.6}Ga_{58.4}O_{384})$	FAU	1992LIE/MOR
72065	Zeolite Y	$Zn_{27.23}(Si_{137}Al_{55}O_{384})$	FAU	1992PEA/SEF
73225	Zeolite NaX	$(Cu(NH_3)_3(H_2O)_3)_{14.4}((Al_{0.15}Si_{0.85})_{192}O_{384})$	FAU	1993VLE/EVM
73647	Zeolite Y	$Na_{2.7}Pb_{12.2}D_{34.1}(Si_{137}Al_{55}O_{384})$	FAU	1993SUN/SEF2
73648	Zeolite Y	$Na_{11}Pb_{25.4}(Si_{137}Al_{55}O_{384})S_4$	FAU	1993SUN/SEF2
73929	Zeolite Y	$Na_{48.8}(Al_{48.8}Si_{143.2}O_{384})$	FAU	1993HRI/EDD
73930	Zeolite Y	$Si_{0.98}O_2$	FAU	1993HRI/EDD
74677	Zeolite X	$Na_{72.9}Rb_{26.8}(Al_{96}Si_{96}O_{384})$	FAU	1993KIM/HAN
75980	Zeolite X	$Na_{78}Rb_{28}(Al_{96}Si_{96}O_{384})$	FAU	1994KIM/HAN
78809	Zeolite X	$Na_{92.8}(Al_{88}Si_{104}O_{384})$	FAU	1995OLS
79793	Zeolite X	$Ba_{46}(Al_{92}Si_{100}O_{384})$	FAU	1995JAN/KIM
80020	Zeolite X	$Ca_{46}(Al_{92}Si_{100}O_{384})$	FAU	1995JAN/SON2
80021	Zeolite X	$Ca_{32}K_{28}(Al_{92}Si_{100}O_{384})$	FAU	1995JAN/SON2
80149	Zeolite X	$K_{92}Al_{92}Si_{100}O_{384}$	FAU	1995JAN/KIM2
80197	Zeolite Y	$Na_{6.88}(Na_{56}((Al_{55.68}Si_{136.32})O_{384}))$	FAU	1995ARM/AND
81067	Zeolite LSX	$Ca_{0.5}(AlSiO_4)$	FAU	1995VIT/BUL
81215	Zeolite X	$Pb_{50}(Al_{88}Si_{104}O_{384})(OH)_{12}Pb_4(H_2O)_{73}$	FAU	1995NAR/RAN
81216	Zeolite X	$Pb_{44}(Al_{88}Si_{104}O_{384})Pb_9(H_2O)_{19}$	FAU	1995NAR/RAN
81217	Zeolite X	$Pb_{37}Cs_{14}(Al_{88}Si_{104}O_{384})Cs_{32}(H_2O)_{79}$	FAU	1995NAR/RAN
81868	Zeolite X	$Ca_{35}Cs_{22}Si_{100}Al_{92}O_{384}$	FAU	1996JAN/SON
81869	Zeolite X	$Ca_{29}Cs_{34}Si_{100}Al_{92}O_{384}$	FAU	1996JAN/SON
81940	Zeolite X	$Cd_{46}(Si_{100}Al_{92}O_{384})$	FAU	1996KWO/JAN
81941	Zeolite X	$Cd_{24.5}Tl_{43}(Si_{100}Al_{92}O_{384})$	FAU	1996KWO/JAN
82606	Zeolite X	$Ag_{92}(Al_{92}Si_{100}O_{384})$	FAU	1996JAN/PAR
82607	Zeolite X	$Ag_{87.71}(Al_{92}Si_{100}O_{384})$	FAU	1996JAN/PAR
82928	Zeolite X	$Na_{13.28}Ni_{16.64}(Si_{145.44}Al_{46.56}O_{384})(H_2O)_{228.48}$	FAU	1996HOR/OHN
82929	Zeolite X	$Pb_{56.22}(H_3O)_{12}(Al_{87.94}Si_{104.06}O_{384})(OH)_{36.5}(H_2O)_{211.404}$	FAU	1996GER/NAR
82930	Zeolite X	$Pb_{37.786}Cs_{44.64}(Al_{87.94}Si_{104.06}O_{384})(OH)_{32.27}(H_2O)_{128.75}$	FAU	1996GER/NAR
83851	Zeolite NaY	$Na_{55.2}(Al_{55.2}Si_{136.8}O_{384})$	FAU	1997GRE/POS

TABLE 2. List of 351 zeolite entries belonging to the framework-type FAU—Continued

ICSD code	Mineral name	Chemical formula	FTC	Reference
83852	Zeolite NaY	$Na_{55.456}(Al_{55.456}Si_{136.544}O_{384})$	FAU	1997GRE/POS
83853	Zeolite NaY	$Na_{52.144}(Al_{52.144}Si_{139.856}O_{384})(CF_2HCF_2H)_{31.104}$	FAU	1997GRE/POS
83854	Zeolite NaY	$Na_{56.32}(Al_{56.32}Si_{135.68}O_{384})(CF_2HCF_2H)_{44.16}$	FAU	1997GRE/POS
84448	Zeolite LSX	$Li_{95.68}(Al_{96}Si_{96}O_{384})$	FAU	1997PLE/DI
84449	Zeolite LSX	$Li_{95.68}(Al_{96}Si_{96}O_{384})$	FAU	1997PLE/DI
84450	Zeolite Y	$Na_{20.48}Rb_{27.84}(Al_{51.84}Si_{140.16})O_{384}$	FAU	1997MAR/FIT
84451	Zeolite X	$(Cd_{46}(Al_{92}Si_{100}O_{384}))(C_2H_4)_{29.5}$	FAU	1997YEO/KIM
84452	Zeolite X	$(Ca_{46}(Al_{92}Si_{100}O_{384}))(C_2H_4)_{30}$	FAU	1997JAN/JEO
84453	Zeolite X	$(Ca_{46}(Al_{92}Si_{100}O_{384}))(C_2H_2)_{30}$	FAU	1997JAN/JEO
84458	Zeolite X	$Na_{88}(Al_{88}Si_{104}O_{384})$	FAU	1997VIT/MEL
84459	Zeolite X	$Na_{88}(Al_{88}Si_{104}O_{384})(C_6D_6)_{2.56}$	FAU	1997VIT/MEL
84460	Zeolite X	$Pb_{32}(Pb_4O_4)_8(Al_{92}Si_{100}O_{384})$	FAU	1997YEO/KIM2
84462	Zeolite X	$Mg_{46}(Al_{92}Si_{100}O_{384})(H_2O)_4$	FAU	1997YEO/JAN
84463	Zeolite X	$Ca_{46}(Al_{92}Si_{100}O_{384})$	FAU	1997YEO/JAN
84464	Zeolite X	$Ba_{46}(Al_{92}Si_{100}O_{384})$	FAU	1997YEO/JAN
84465	Zeolite X	$Na_{56.6}(Na_{42.2})Al_{92}Si_{100}O_{384}$	FAU	1997SHI/SEF
84466	Zeolite X	$Mn_{46}(Al_{92}Si_{100}O_{384})$	FAU	1997JAN/JEO2
84467	Zeolite X	$(Mn_{46}(Al_{92}Si_{100}O_{384}))(C_2H_4)_{30}$	FAU	1997JAN/JEO2
85443	Zeolite X	$Tl_{92}Al_{92}Si_{100}O_{384}$	FAU	1997KIM/HAN
85568	Zeolite X	$Rb_{71}Na_{21}Al_{92}Si_{100}O_{384}$	FAU	1998LEE/KIM
85612	Zeolite LiX-1.0	$Li_{96}(AlSiO_4)_{96}$	FAU	1998FEU/LOB
85613	Zeolite LiX-1.0	$Li_{96}(AlSiO_4)_{96}$	FAU	1998FEU/LOB
85614	Zeolite LiX-1.25	$Li_{86}(Al_{86}Si_{106}O_{384})$	FAU	1998FEU/LOB
85615	Zeolite LiX-1.25	$Li_{86}(Al_{86}Si_{106}O_{384})$	FAU	1998FEU/LOB
85620	Zeolite Na-LSX	$Na_{96}(Al_{96}Si_{96}O_{384})(H_2O)_{384.3}$	FAU	1998LEE/CAR
85621	Zeolite NaK-LSX20	$Na_{77}K_{19}Al_{96}Si_{96}O_{384}(H_2O)_{396.9}$	FAU	1998LEE/CAR
85622	Zeolite NaK-LSX42	$Na_{56}K_{40}Al_{96}Si_{96}O_{384}(H_2O)_{408.7}$	FAU	1998LEE/CAR
85623	Zeolite NaK-LSX80	$Na_{24.4}K_{71.6}Al_{96}Si_{96}O_{384}(H_2O)_{494.2}$	FAU	1998LEE/CAR
85624	Zeolite NaK-LSX80	$Na_{19}K_{77}Al_{96}Si_{96}O_{384}(H_2O)_{385.7}$	FAU	1998LEE/CAR
85625	Zeolite K-LSX	$K_{96}Al_{96}Si_{96}O_{384}(H_2O)_{362.3}$	FAU	1998LEE/CAR
86204	Zeolite Y	$Ni_{30}Na_7(Al_{55}Si_{137}O_{384})Cl_{12}$	FAU	1998HAN/SEF
86205	Zeolite Y	$Ni_{30}Na_7(Al_{55}Si_{137}O_{384})Cl_{12}(D_2O)_{38}$	FAU	1998HAN/SEF
86508	Zeolite Y	$(Na_{52.6}Ca)(Al_{55}Si_{137}O_{384})$	FAU	1980JIR/VRA
86509	Zeolite Y	$H_{20}Na_{33}CaAl_{55}Si_{137}O_{384}$	FAU	1980JIR/VRA
86510	Zeolite Y	$H_{39.6}Na_{13.4}CaAl_{55}Si_{137}O_{384}$	FAU	1980JIR/VRA
86511	Zeolite Y	$H_{52}NaCaAl_{55}Si_{137}O_{384}$	FAU	1980JIR/VRA
86621	Zeolite X;	$Cd_{46}Si_{100}Al_{92}O_{384}(C_6H_6)_{43}$	FAU	1998KIM/YEO
86854	Zeolite Y	$Na_{20.65}Rb_{27.26}(Si_{140.16}Al_{51.84})O_{384}$	FAU	1998FIT/MAR
87236	Zeolite CeHY	$Na_{10.24}Ce_{7.68}H_{22.72}(Al_{56}Si_{136})O_{384}$	FAU	1971GAL/IME2
87237	Zeolite CeHY	$Na_{7.04}Ce_{9.76}H_{17.24}(Al_{56}Si_{136})O_{384}(H_2O)_{11.84}(NH_3)_{11.84}$	FAU	1971GAL/IME2
87525	Zeolite X	$Cd_{55.1}(Al_{92}Si_{100}O_{384})(OH)_{18.2}(H_2O)_{113.9}$	FAU	1998SMO/SHE
87526	Zeolite X	$Cd_{52.7}(Al_{92}Si_{100}O_{384})(OH)_{13.4}(H_2O)_{5.6}$	FAU	1998SMO/SHE
87527	Zeolite X	$Cd_{59.2}S_{4.7}(OH)_{17}(Al_{92}Si_{100}O_{384})(H_2O)_{82.9}$	FAU	1998SMO/SHE2
87528	Zeolite X	$Cd_{57.3}(OH)_{22.6}(Al_{92}Si_{100}O_{384})(H_2O)_{3.4}$	FAU	1998SMO/SHE2
87529	Zeolite X	$Cd_{41.88}H_{36.64}S_{14.2}(Al_{92}Si_{100}O_{384})(H_2O)_{19}$	FAU	1998SMO/SHE2
87530	Zeolite X	$Cd_{22.5}H_{93.76}S_{23.38}(Al_{92}Si_{100}O_{384})(H_2O)_{5.5}$	FAU	1998SMO/SHE2
87560	Zeolite X	$(Ca_{46}(Al_{92}Si_{100}O_{384}))(H_2S)_{149}$	FAU	1998JAN/JEO
87562	Zeolite Y	$Cu_{24}Na_5H_{17}(Al_{55}Si_{137}O_{384})Cl_{15}$	FAU	1998HAN/SEF2
87563	Zeolite Y	$Cu_{24}Na_5H_{17}(Al_{55}Si_{137}O_{384})Cl_{15}(D_2O)_{12}$	FAU	1998HAN/SEF2
87564	Zeolite X	$(Mn_{46}(Al_{92}Si_{100}O_{384}))(CO)_{30}$	FAU	1998BAE/KIM
87731	Zeolite X	$(Ca_{46}(Si_{100}Al_{92}O_{384}))(C_3H_6)_{30}$	FAU	1999CHO/KIM
87850	Zeolite X	$Na_{93.44}(Al_{93}Si_{99}O_{384})$	FAU	1999POR/SOU
88421	Zeolite X	$Ca_{18}Tl_{56}(Si_{100}Al_{92}O_{384})$	FAU	1999CHO/KIM2

TABLE 2. List of 351 zeolite entries belonging to the framework-type FAU—Continued

ICSD code	Mineral name	Chemical formula	FTC	Reference
88422	Zeolite X	$Ca_{32}Tl_{28}(Si_{100}Al_{92}O_{384})$	FAU	1999CHO/KIM2
88545	Zeolite X	$Na_{60}(H_3O)_{32}(Si_{100}Al_{92}O_{384})(H_2O)_{24}$	FAU	1999ZHU/SEF
88546	Zeolite X	$Na_{60}H_{32}(Si_{100}Al_{92}O_{384})$	FAU	1999ZHU/SEF
88552	Zeolite X	$(Zn_{6.875}H(Al_{0.988}O_4))_8H_8(Si_{104}Al_{88}O_{384})$	FAU	1999BAE/ZHE
88553	Zeolite X	$Cd_{46}(Si_{100}Al_{92}O_{384})Zn_{20}$	FAU	1999ZHE/SEF
88556	Zeolite X	$Na_{92}(Si_{100}Al_{92}O_{384})$	FAU	1999ZHU/SEF2
88904	Zeolite X	$Pb_{49}Tl_{18}O_{17}(Si_{100}Al_{92}O_{384})$	FAU	1999YEO/KIM
88909	Zeolite X	$(NH_3)_{134.6}(Ca_{46}(Si_{100}Al_{92}O_{384}))$	FAU	1999JAN/JEO
88914	Zeolite X	$Sr_{46}(Si_{100}Al_{92}O_{384})$	FAU	1999KIM/JEO
88915	Zeolite X	$(Sr_{46}(Si_{100}Al_{92}O_{384}))(NH_3)_{102}$	FAU	1999KIM/JEO
88927	Zeolite X	$Na_{24}Co_{38}(Al_{92}Si_{100}O_{384})(OH)_8(H_2O)_{40}$	FAU	1999BAE/SEF
88928	Zeolite X	$Na_{11}Co_{38}(H_3O)_{18}(Al_{92}Si_{100}O_{384})(OH)_{13}(H_2O)_{61}$	FAU	1999BAE/SEF
88929	Zeolite X	$Na_8Co_{46}Si_{100}Al_{92}O_{384}(OH)_8(H_2O)_{39}$	FAU	1999BAE/SEF
89840	Zeolite X	$Zn_{46}Si_{100}Al_{92}O_{384}(ZnO)_8$	FAU	2000LEE/KIM
89841	Zeolite X	$Zn_{13}Tl_{66}Si_{100}Al_{92}O_{384}(ZnO)_2$	FAU	2000LEE/KIM
90711	Zeolite X	$Rb_{140}(Al_{92}Si_{100}O_{384})$	FAU	2000LEE/KIM2
90713	Zeolite X	$La_{38}Al_{92}Si_{100}O_{384}(OH)_{22}(H_2O)_{61.9}$	FAU	2000PAR/SEF
90714	Zeolite X	$La_{37.63}(H_3O)_{37.7}Al_{92}Si_{100}O_{384}(OH)_{58.59}(H_2O)_{41.31}$	FAU	2000PAR/SEF
90715	Zeolite X	$La_{33.1}(H_3O)_{16}Al_{92}Si_{100}O_{384}(OH)_{23.3}(H_2O)_{143.9}$	FAU	2000PAR/SEF
90716	Zeolite X	$Pd_{14}(OHPdOPdOH)_8Na_{32}(Al_{92}Si_{100}O_{384})$	FAU	2000LEE/KIM3
90717	Zeolite X	$Na_{87.30}(Al_{88}Si_{104}O_{384})(H_2O)_{32.64}$	FAU	2000KIR/HUN
90718	Zeolite X	$K_{66.56}Na_{21.66}(Al_{88}Si_{104}O_{384})(H_2O)_{7.137}$	FAU	2000KIR/HUN
90719	Zeolite X	$Cs_{4.51}Na_{83.75}(Al_{88}Si_{104}O_{384})(H_2O)_{34.84}$	FAU	2000KIR/HUN
90720	Zeolite X	$Cs_{27.49}Na_{60.88}(Al_{88}Si_{104}O_{384})(H_2O)_{18.72}$	FAU	2000KIR/HUN
90721	Zeolite Y	$Na_{54.91}(Al_{56}Si_{136}O_{384})(H_2O)_{18.62}$	FAU	2000KIR/HUN
90722	Zeolite Y	$K_{35.54}Na_{19.39}(Al_{56}Si_{136}O_{384})(H_2O)_{14.98}$	FAU	2000KIR/HUN
90723	Zeolite Y	$Rb_{27.74}Na_{27.6}(Al_{56}Si_{136}O_{384})(H_2O)_{4.32}$	FAU	2000KIR/HUN
90724	Zeolite Y	$Cs_{24.16}Na_{31.73}(Al_{56}Si_{136}O_{384})(H_2O)_{6.94}$	FAU	2000KIR/HUN
90727	Zeolite X	$In_{88}(Al_{92}Si_{100}O_{384})$	FAU	2000HEO/JUN
90728	Zeolite X	$In_{87}(Al_{92}Si_{100}O_{384})$	FAU	2000HEO/JUN
90729	Zeolite X	$K_{90.1}(Al_{92}Si_{100}O_{384})$	FAU	2000ZHU/SEF
91530	Zeolite X	$Na_{7.4}Se_{46.1}(Al_{96}Si_{96}O_{384})$	FAU	2000SMO/SHE
91531	Zeolite X	$Na_{36}Te_{38.1}(Al_{96}Si_{96}O_{384})$	FAU	2000SMO/SHE
91675	Zeolite X	$Tl_{74.18}Na_{17.81}(Al_{92}Si_{100}O_{384})$	FAU	2000ZHU/SEF2
91676	Zeolite X	$Tl_{82.94}Na_{9.17}(Al_{92}Si_{100}O_{384})$	FAU	2000ZHU/SEF2
91689	Zeolite X	$Ni_2(Ni(OH))_{35}(Ni_4AlO_4)_2(H_3O)_{46}(Al_{91}Si_{101}O_{384})(H_2O)_{55}$	FAU	2000BAE/SEF
91690	Zeolite X	$Zn_{54.6}(H_3O)_{37.2}(Al_{92}Si_{100}O_{384})(OH)_{54.4}$	FAU	2000BAE/SEF2
91691	Zeolite X	$Zn_{55.3}(H_3O)_{40}(Al_{92}Si_{100}O_{384})(OH)_{58.85}$	FAU	2000BAE/SEF2
91692	Zeolite X	$Mn_{46.6}(Al_{92}Si_{100}O_{384})(C_3H_6)_{31.13}$	FAU	2000CHO/KIM
91702	Zeolite-Y	$Nd_{12.16}Na_{16.96}Al_{5.5}(AlO_2)_{45.4}(SiO_2)_{146.6}(OH)_{8.03}(H_2O)_{36.9}$	FAU	2000NER/GIO
91703	Zeolite-Y	$Sm_{12.16}Na_{16.32}Al_{2.59}(AlO_2)_{41.1}(SiO_2)_{150.9}(OH)_{11.69}(H_2O)_{46.29}$	FAU	2000NER/GIO
91704	Zeolite-Y	$Gd_{12.16}Na_{16.96}Al_{3.84}(AlO_2)_{47.77}(SiO_2)_{144.23}(OH)_{5.67}(H_2O)_{61.15}$	FAU	2000NER/GIO
91705	Zeolite-Y	$Dy_{8.96}Na_{24.96}Al_{10.56}(AlO_2)_{41.93}(SiO_2)_{150.07}(OH)_{9.9}(H_2O)_{51.54}$	FAU	2000NER/GIO
91706	Zeolite X	$Ag_{92}(Al_{92}Si_{100}O_{384})(H_2O)_{48}$	FAU	2000LEE/KIM4
92794	Zeolite X	$Pd_{18}Tl_{56}(Si_{100}Al_{92}O_{384})$	FAU	2001YOO/SON
92795	Zeolite X	$Pd_{21}Tl_{50}Si_{100}Al_{92}O_{384}$	FAU	2001YOO/SON
92900	Faujasite	$Na_{56}(Al_{56}Si_{136}O_{384})$	FAU	2001YON/BUS
92973	Zeolite X	$Mn_{28}Cs_{36}(Al_{92}Si_{100}O_{384})$	FAU	2001BAE/SON
92974	Zeolite X	$Mn_{21.5}Rb_{49}(Al_{92}Si_{100}O_{384})$	FAU	2001BAE/SON
93959	Zeolite X	$Na_{97.8}(Al_{92}Si_{100}O_{384})$	FAU	2001ZHU/SEF2
93961	Zeolite Y	$Na_{10.4}Rb_{47.26}(Si_{135.8}Al_{56.1}O_{384})$	FAU	2001CIR/HAN
94779	Zeolite NaY	$Na_{62}H_2Al_{64}Si_{128}O_{384}$	FAU	2002FOW/IBB
94780	Zeolite NaY	$Cu_{27.5}Na_{11.4}(OD)_{4.5}(Al_{64}Si_{128}O_{384})$	FAU	2002FOW/IBB

TABLE 2. List of 351 zeolite entries belonging to the framework-type FAU—Continued

ICSD code	Mineral name	Chemical formula	FTC	Reference
94781	Zeolite NaY	$Cu_{26.9}Na_{11}(OD)_{4.6}Al_{7.7}Al_{64}Si_{128}O_{384}$	FAU	2002FOW/IBB
94783	Zeolite NaY	$Cu_{28.1}Na_{4.8}Al_{64}Si_{128}O_{384}$	FAU	2002FOW/IBB
95430	Zeolite X	$Cd_{68}(Al_{92}Si_{100}O_{384})$	FAU	2002CHO/LEE
95479	Zeolite X	$Ag_{92}(Al_{92}Si_{100}O_{384})$	FAU	2002LEE/KIM
97012	Zeolite X	$Cd_{32}Cs_{28}(Al_{92}Si_{100}O_{384})$	FAU	2002JEO/KIM
97013	Zeolite X	$Cd_{28}Rb_{36}(Al_{92}Si_{100}O_{384})$	FAU	2002JEO/KIM
97014	Zeolite X	$Ag_{27}Tl_{65}(Al_{92}Si_{100}O_{384})$	FAU	2002KIM/CHO
97015	Zeolite X	$Ag_{23}Tl_{69}(Al_{92}Si_{100}O_{384})$	FAU	2002KIM/CHO
97410	Zeolite X	$In_{66}(Al_{92}Si_{100}O_{384})$	FAU	2003HEO/PAR
97921	Zeolite X	$(Ag_{92}(Al_{92}Si_{100}O_{384}))(C_2H_4)_{27}$	FAU	2003CHO/KIM
98359	Zeolite X	$(Cd_{46}Al_{92}Si_{100}O_{384})I_{89.5}$	FAU	2003SON/CHO
98366	Zeolite X	$Mn_{46}(Al_{92}Si_{100}O_{384})(H_2S)_{89}$	FAU	2003BAE/MEE
98402	Zeolite NaY	$Na_{54}(Al_{54}Si_{138}O_{384})(CFCl_3)_{12.87}$	FAU	2003MEL/ROD
100529	Zeolite Y	$Fe_{10.56}Na_{28}(Al_{56}Si_{136}O_{384})(H_2O)_{32}H_{.688}$	FAU	1981PEA/MOR2
100530	Zeolite Y	$Fe_{14.08}Na_{26.56}(Al_{56}Si_{136}O_{384})(H_2O)_8H_{1.28}$	FAU	1981PEA/MOR2
100531	Zeolite Y	$Fe_{12.52}Na_{30.4}(Al_{56}Si_{136}O_{384})(H_2O)_{41}$	FAU	1981PEA/MOR2
100532	Zeolite Y	$Fe_{14.36}Na_{27.92}(Al_{56}Si_{136}O_{384})(H_2O)_{47}H_{.64}$	FAU	1981PEA/MOR2
100860	Zeolite X	$Cr_{4.2}Na_{74}(AlO_2)_{86}(SiO_2)_{106}(H_2O)_{230}$	FAU	1981PEA/MOR
100861	Zeolite Y	$Cr_{3.8}Na_{43.8}(AlO_2)_{56}(SiO_2)_{136}(H_2O)_{245}$	FAU	1981PEA/MOR
100862	Zeolite Y	$Cr_{3.8}Na_{43.8}(AlO_2)_{56}(SiO_2)_{136}(H_2O)_{245}$	FAU	1981PEA/MOR
100863	Zeolite Y	$Cr_{3.8}Na_{44.2}(AlO_2)_{56}(SiO_2)_{136}(H_2O)_{245}$	FAU	1981PEA/MOR
100864	Zeolite Y	$Cr_4Na_{44}(AlO_2)_{56}(SiO_2)_{136}(H_2O)_{245}$	FAU	1981PEA/MOR
109007	Faujasite	$Pd_{13.7}Na_{14.7}H_{14.4}Al_{56}Si_{136}O_{384}$	FAU	1981BER/GAL
109008	Faujasite	$Pd_{13.7}Na_{11.4}H_{17.3}Al_{56}Si_{136}O_{384}$	FAU	1981BER/GAL
109009	Faujasite	$Pd_{13.7}Na_{17.0}H_{11.5}Al_{56}Si_{136}O_{384}$	FAU	1981BER/GAL
151841	Zeolite X (Ca-exchanged)	$(Ca_{46.6}(CH_3NH_2)_{16.6})(Si_{100}Al_{92}O_{384})$	FAU	2004JEO/KIM
153025	Zeolite X (Cd-exchanged; dehyd.)	$(Cd_{46}(NO)_{16})(Si_{100}Al_{92}O_{384})$	FAU	2005LEE/KIM
153026	Zeolite X (Cd-exchanged; dehyd.)	$(Cd_{46}(N_2O_4)_{25.5})(Si_{100}Al_{92}O_{384})$	FAU	2005LEE/KIM
153344	Zeolite NaY	$Na_{56}Al_{56}Si_{136}O_{384}(C_6H_6)_{16}$	FAU	2005MEN
153345	Zeolite NaY	$Na_{56}Al_{56}Si_{136}O_{384}(C_6H_6)_{36.8}$	FAU	2005MEN
153346	Zeolite NaY	$Na_{56}Al_{56}Si_{136}O_{384}(C_6H_6)_{39.9}$	FAU	2005MEN
153347	Zeolite Y	$Si_{192}O_{384}(C_6D_6)_{8.4}$	FAU	2005MEN
153348	Zeolite Y	$Si_{192}O_{384}(C_6D_6)_{14.2}$	FAU	2005MEN
153349	Zeolite Y	$Si_{192}O_{384}(C_6D_6)_{28}$	FAU	2005MEN
153350	Zeolite Y	$Si_{192}O_{384}(C_6D_6)_{31.7}$	FAU	2005MEN
153351	Zeolite Y	$Si_{192}O_{384}(C_6D_6)_{35.5}$	FAU	2005MEN
153352	Zeolite Y	$Si_{192}O_{384}(C_6D_6)_{31.7}$	FAU	2005MEN
153353	Zeolite NaY	$Na_{56}Al_{56}Si_{136}O_{384}(C_6H_6)_{1.3}(H_2O)_{18}$	FAU	2005MEN
153354	Zeolite NaY	$Na_{56}Al_{56}Si_{136}O_{384}(C_6H_6)_{15}(H_2O)_{18}$	FAU	2005MEN
153355	Zeolite NaY	$Na_{56}Al_{56}Si_{136}O_{384}(C_6H_6)_{29}(H_2O)_{18}$	FAU	2005MEN
153356	Zeolite NaY	$Na_{56}Al_{56}Si_{136}O_{384}(C_6H_6)_{43}(H_2O)_{18}$	FAU	2005MEN
155224	Zeolite Y (Cd-exchanged; dehyd.)	$(Cd_{27.5}(Cd_8O_4)_2)(Si_{121}Al_{71}O_{384})$	FAU	2006LEE/JEO
155226	Zeolite X (Cd-exchanged; dehyd.)	$(Cd_{46}(CH_3NH_2)_{16})(Si_{100}Al_{92}O_{384})$	FAU	2006JEO/KIM
155229	Zeolite X (Mn-exchanged; dehyd.)	$(Mn_{46}(NO)_{16})(Si_{100}Al_{92}O_{384})$	FAU	2006JEO/KIM2
155230	Zeolite X (Mn-exchanged; dehyd.)	$(Mn_{46}(NO_2)_{28})(Si_{100}Al_{92}O_{384})$	FAU	2006JEO/KIM2
200506	Zeolite X	$Na_{2.5}Nd_{2.19}(Al_{5.04}Si_{6.96}O_{24})(H_2O)_{6.48}$	FAU	1979SHE/SMO
200507	Zeolite X	$Na_{1.25}Nd_{1.25}(Al_5Si_7O_{24})(H_2O)_{5.2}$	FAU	1979SHE/SMO
200521	Zeolite X	$Na_{5.0625}(Al_{5.0625}Si_{6.9375})O_{24}(H_2O)_{9.07}$	FAU	1979SMO/SHE
200522	Zeolite X	$Na_{3.42}(Al_{3.42}Si_{4.58})O_{16}(H_2O)_{14.27}$	FAU	1979SMO/SHE
200634	Zeolite Y	$Mn_{1.21}Na_{1.09}Al_{3.5}Si_{8.5}O_{24}(H_2O)_{16.375}$	FAU	1979PEA/MOR
200635	Zeolite Y	$Mn_{1.21}Na_{1.09}Al_{3.5}Si_{8.5}O_{24}(H_2O)_{7.75}$	FAU	1979PEA/MOR

TABLE 2. List of 351 zeolite entries belonging to the framework-type FAU—Continued

ICSD code	Mineral name	Chemical formula	FTC	Reference
200636	Zeolite Y	$Mn_{1.21}Na_{1.09}Al_{3.5}Si_{8.5}O_{24}(H_2O)_{7.26}$	FAU	1979PEA/MOR
201443	Zeolite Y	$Ag_{55.5}Al_{55.5}Si_{136.5}O_{384}$	FAU	1981GEL/MOR3
201444	Faujasite	$Ag_{55.5}Al_{55.5}Si_{136.5}O_{384}$	FAU	1981GEL/MOR3
201445	Faujasite	$Ag_{54.5}Al_{55.5}Si_{136.5}O_{384}$	FAU	1981GEL/MOR3
201446	Faujasite	$Ag_{63.7}Al_{63.7}Si_{128.3}O_{384}$	FAU	1981GEL/MOR3
201447	Faujasite	$Ag_{55.4}Al_{55.5}Si_{136.5}O_{384}$	FAU	1981GEL/MOR3
201448	Faujasite	$Ag_{55.5}Al_{55.5}Si_{136.5}O_{384}$	FAU	1981GEL/MOR3
201450	Faujasite	$Ag_{50.8}Al_{55.5}Si_{136.5}O_{384}$	FAU	1981GEL/MOR2
201451	Faujasite	$Ag_{61.1}Al_{69.8}Si_{122.2}O_{384}$	FAU	1981GEL/MOR2
201452	Faujasite	$Ag_{79.7}Al_{86}Si_{106}O_{384}$	FAU	1981GEL/MOR2
201454	Faujasite	$Ag_{86}Al_{86}Si_{106}O_{384}(H_2O)_{38.72}$	FAU	1981GEL/MOR2
201456	Zeolite X	$Li_{62.4}Al_{86}Si_{106}O_{384}H_{23.6}$	FAU	1982HER/EIN
201457	Zeolite Y	$H_4Na_{12.8}Li_{39.2}Al_{56}Si_{136}O_{384}$	FAU	1982HER/EIN
201472	Zeolite NaY	$Na_{27}(Al_{57}Si_{135}O_{384})(H_2O)_{24}$	FAU	1984MOR/VAN
201473	Zeolite Y	$Na_{57}Al_{57}Si_{135}O_{384}(H_2O)_{6.4}$	FAU	1984MOR/VAN
201474	Zeolite NaY	$Na_{57}Al_{57}Si_{135}O_{384}(H_2O)_{3.8}$	FAU	1984MOR/VAN
203008	Zeolite X	$Li_{80.7}H_{4.9}Na_{0.4}(Al_{86}Si_{106}O_{384})$	FAU	1989FOR/SLA
203009	Zeolite Y	$Li_{46}H_{5.76}Na_{5.12}K_{0.1}(Al_{57}Si_{135}O_{384})$	FAU	1989FOR/SLA

TABLE 3. List of 269 zeolite entries belonging to the framework-type LTA

ICSD code	Mineral name	Chemical formula	FTC	Reference
4387	Zeolite A	$K_{12}Al_{12}Si_{12}O_{48}(H_2O)_{20}$	LTA	1975LEU/KUN
4388	Zeolite A	$Cs_7Na_5Si_{12}Al_{12}O_{48}$	LTA	1975VAN/SEF
4389	Zeolite 4A	$Mn_{4.5}Na_3Al_{12}Si_{12}O_{48}(C_2H_2)_{4.5}$	LTA	1975RIL/SEF
4390	Zeolite A	$Co_4Na_4Al_{12}Si_{12}O_{48}(C_2H_4)_4$	LTA	1975RIL/KUN
4391	Zeolite A	$Co_{.333}Na_{.333}(AlSiO_4)(H_2O)_{2.92}$	LTA	1975RIL/SEF2
6270	Zeolite A	$Mn_{4.5}Na_3(Si_{12}Al_{12}O_{48})$	LTA	1974YAN/VAN
6271	Zeolite A	$Co_4Na_4(Si_{12}Al_{12}O_{48})$	LTA	1974RIL/SEF
9326	Zeolite A	$Na(AlSiO_4)$	LTA	1968SMI/DOW
10119	Zeolite 4A	$Co_4Na_4Al_{12}Si_{12}O_{48}(C_2H_2)_4$	LTA	1975RIL/SEF
10122	Zeolite A	$K_{12}Si_{12}Al_{12}O_{48}$	LTA	1975LEU/KUN
10160	Zeolite A	$(Co_4Na_4(Si_{12}Al_{12}O_{48}))(CO)_4$	LTA	1974RIL/SEF
10169	Zeolite A	$Mn_{4.5}Na_3Si_{12}Al_{12}O_{48}(H_2O)_{26.5}$	LTA	1974YAN/VAN
10288	Zeolite 4A	$Na_{12}Al_{12}Si_{12}O_{48}$	LTA	1973YAN/AMA
10373	Zeolite 4A	$Na_{12}Si_{12}Al_{12}O_{48}(NH_3)_8$	LTA	1973YAN/SEF
15392	Zeolite 5A	$Ca_4Na_4Al_{12}Si_{12}O_{48}$	LTA	1967SEF/SHO
15393	Zeolite 5A	$Na_4Ca_4Si_{12}Al_{12}O_{48}(I_2)_{5.52}$	LTA	1967SEF/SHO
16491	Zeolite 4A	$(Na_{12}(Al_{12}Si_{12}O_{48}))(C_2H_2)_6$	LTA	1973AMA/SEF
24901	Zeolite LTA	$Na_{12}(Al_{12}Si_{12}O_{48})(H_2O)_{27}$	LTA	1971GRA/MEI
26911	Zeolite A	$Na_{12}(Al_{12}Si_{12}O_{48})$	LTA	1956REE/BRE
26912	Zeolite A	$Tl_8Na_4(Al_{12}Si_{12}O_{48})$	LTA	1956REE/BRE
26913	Zeolite A	$Li_8Na_4((AlO_2)_{12}(SiO_2)_{12})$	LTA	1956REE/BRE
27323	Zeolite A	$Na_8(Br_2)_{5.28}Al_8Si_{16}O_{48}(H_2O)_{24}$	LTA	1966MEI/SHO
27915	Zeolite A	$Cd_{5.86}Si_{12}Al_{12}O_{48}(H_2O)_{1.70}$	LTA	1980MCC/SEF
27916	Zeolite A	$Cd_{5.8}Si_{12}Al_{12}O_{48}(H_2O)_{2.3}$	LTA	1980MCC/SEF
27917	Zeolite A	$Zn_5Na_2Si_{12}Al_{12}O_{48}(H_2O)_{24}$	LTA	1980KIM/SEF
28038	Zeolite A	$Na_{22.1}Al_{12}Si_{12}O_{48}(NO_3)_{9.4}(H_2O)_{15.1}$	LTA	1975BAR/VIL
30018	Zeolite A	$K_{91}Al_{96}Si_{96}O_{384}$	LTA	1979PLU/SMI
30597	Zeolite A	$(Ag_{12}Si_{12}Al_{12}O_{48})(C_2H_4)_{3.65}$	LTA	1978KIM/SEF2
30598	Zeolite A	$Cd_8Si_{12}Al_{12}O_{48}(H_2O)_3$	LTA	1979MCC/SEF
30599	Zeolite A	$Cd_6Si_{12}Al_{12}O_{48}(H_2O)_3$	LTA	1979MCC/SEF
30740	Zeolite A	$Ag_{66.31}Si_{96}Al_{96.9}O_{384}H_{27}$	LTA	1983GEL/SMI
33247	Zeolite A	$Li_{9.7}Na_{2.3}(Si_{.5}Al_{.5})_{24}O_{48}$	LTA	1983JIR/BOS
33248	Zeolite A	$Li_9Na_3(Al_{.5}Si_{.5})_{24}O_{48}$	LTA	1983JIR/BOS

TABLE 3. List of 269 zeolite entries belonging to the framework-type LTA—Continued

ICSD code	Mineral name	Chemical formula	FTC	Reference
34100	Zeolite A	$Na_{91.78}Al_{96}Si_{96}O_{384}$	LTA	1980PLU/SMI
34101	Zeolite A	$(NH_4)_{12}Al_{12}Si_{12}O_{48}$	LTA	1981MCC/SEF3
34296	Zeolite A	$Zn_5K_2Al_{12}Si_{12}O_{48}(H_2O)_{3.5}$	LTA	1976RAG/SEF
34937	Zeolite A	$Ag_{12}Al_{12}Si_{12}O_{48}(H_2O)_{15.6}$	LTA	1975THO
34938	Zeolite A	$Ca_6Al_{12}Si_{12}O_{48}(H_2O)_{21.67}$	LTA	1975THO
34939	Zeolite A	$Tl_{12}Al_{12}Si_{12}O_{48}(H_2O)_{12.24}$	LTA	1975THO
35119	Zeolite 4A	$Na_{92}Al_{92}Si_{100}O_{384}$	LTA	1982ADA/HAS
35120	Zeolite 4A	$Na_{11.5}Al_{11.5}Si_{12.5}O_{48}$	LTA	1982ADA/HAS
35680	Zeolite A	$Ca_{5.57}Al_{0.3}(Al_{12}Si_{12}O_{48})(H_2O)_{1.2}$	LTA	1983PLU/SMI
35681	Zeolite A	$Ca_{5.6}Al_{12.3}Si_{12}O_{49.2}H_{1.5}$	LTA	1983PLU/SMI
35691	Zeolite A	$Rb_{9.04}Na_{1.47}Ba_{.54}Al_{12}Si_{12}O_{48}$	LTA	1983PLU/SMI3
35692	Zeolite A	$Rb_{9.04}Ba_{.54}Na_{1.475}Al_{12}Si_{12}O_{48}$	LTA	1983PLU/SMI3
35693	Zeolite A	$Rb_{9.61}Na_{.90}Ba_{.41}Al_{11.4}Si_{12.6}O_{48}$	LTA	1983PLU/SMI3
35694	Zeolite A	$Rb_{9.58}Na_{0.9}Ba_{0.41}Al_{12}Si_{12}O_{48}$	LTA	1983PLU/SMI2
35695	Zeolite A	$Rb_{9.12}NaBaAl_{12}Si_{12}O_{48}$	LTA	1983PLU/SMI3
37300	Zeolite A	$Ag_3Na_{6.6}Al_{12}Si_{12}O_{48}$	LTA	1983SCH/GEL
37301	Zeolite A	$Ag_3Na_{6.6}Al_{12}Si_{12}O_{48}$	LTA	1983SCH/GEL
37302	Zeolite A	$Ag_3Na_{6.6}Al_{12}Si_{12}O_{48}$	LTA	1983SCH/GEL
37303	Zeolite A	$Ag_3Na_{6.6}Al_{12}Si_{12}O_{48}$	LTA	1983SCH/GEL
37304	Zeolite A	$Ag_3Na_{13.6}Al_{12}Si_{12}O_{48}$	LTA	1983SCH/GEL
37305	Zeolite A	$Ag_{3.19}Na_{13.54}Al_{12}Si_{12}O_{48}$	LTA	1983SCH/GEL
37306	Zeolite A	$Ag_{2.97}Na_{7.66}Al_{12}Si_{12}O_{48}$	LTA	1983SCH/GEL
37307	Zeolite A	$Ag_{3.11}Na_{9.24}Al_{12}Si_{12}O_{48}$	LTA	1983SCH/GEL
37308	Zeolite A	$Ag_{3.80}Na_{4.38}Al_{12}Si_{12}O_{48}$	LTA	1983SCH/GEL
37309	Zeolite A	$Ag_{3.48}Na_{8.08}Al_{12}Si_{12}O_{48}$	LTA	1983SCH/GEL
38170	Zeolite A	$Na(AlSiO_4)$	LTA	1960HOW
40126	Zeolite A	$Cs_7Na_5Si_{12}Al_{12}O_{48}$	LTA	1975VAN/SEF
40134	Zeolite A	$K_{11}Si_{12}Al_{12}O_{48}$	LTA	1979PLU/SMI
40409	Zeolite A	$Ag_9Cs_3(Al_{12}Si_{12}O_{48})$	LTA	1988KIM/SEF
40934	Zeolite 4A	$Ni_{3.5}Na_3H_{0.5}Al_{0.5}(Al_{12}Si_{12}O_{48})(H_2O)_{40}$	LTA	1986HEO/CRU
41552	Zeolite A	$Zn_6Al_{12}Si_{12}O_{48}(H_2O)_{29}$	LTA	1981MCC/SEF2
41553	Zeolite A	$Zn_6Al_{12}Si_{12}O_{48}(H_2O)_{12}$	LTA	1981MCC/SEF2
41660	Zeolite A	$(CoSCH_3)_3CoNa_4(Si_{12}Al_{12}O_{48})$	LTA	1980SUB/SEF2
41664	Zeolite A	$Ag_{12}(Si_{12}Al_{12}O_{48})(H_2O)_{6.7}$	LTA	1981GEL/MOR
41665	Zeolite A	$Ag_{12}(Si_{12}Al_{12}O_{48})$	LTA	1981GEL/MOR
41666	Zeolite A	$Ag_{12}(Si_{12}Al_{12}O_{48})$	LTA	1981GEL/MOR
41667	Zeolite A	$Ag_3K_9Si_{12}Al_{12}O_{48}(H_2O)_{10.4}$	LTA	1981GEL/MOR
41783	Zeolite A	$(Co_4Na_4(Si_{12}Al_{12}O_{48}))(C_3H_6)_4$	LTA	1978CRU/LEU
41784	Zeolite A	$(Mn_4Na_4(Si_{12}Al_{12}O_{48}))(C_3H_6)_4$	LTA	1978CRU/LEU
43802	Zeolite 4A	$Na_{12}(Si_{12}Al_{12}O_{48})$	LTA	1960BRO/SHO
43803	Zeolite 5A; calcian	$Na_4Ca_4(Si_{12}Al_{12}O_{48})$	LTA	1960BRO/SHO
44530	Zeolite A; sodian	$(Na_{12}Al_{12}Si_{12}O_{48})NaAlO_2(H_2O)_{29}$	LTA	1958BAR/MEI
47160	Zeolite A	$Na_{3.69}Tl_{7.26}Si_{12}Al_{12}O_{48}$	LTA	1983CHE/EDD
48008	Zeolite 5A	$Ca_5Na_2Al_{12}Si_{12}O_{48}$	LTA	1984ADA/HAS2
48009	Zeolite 5A	$Ca_5Na_2Si_{12}Al_{12}O_{48}$	LTA	1984ADA/HAS2
49663	Zeolite A	$Co_{3.5}NaSi_8Al_8O_{32}(CO)Al_{.5}(OH)_2$	LTA	1984ADA/HAS
49743	Zeolite A	$Pb_{6.34}Al_{12.7}Si_{11.3}O_{48}$	LTA	1985RON/SEF
49744	Zeolite A	$Pb_{8.75}Al_{9.5}Si_{14.5}O_{48}(H_2O)_{4.2}(OH)_8$	LTA	1985RON/SEF
54068	Zeolite A	$(Co_{3.5}Na_5(Al_{12}Si_{12}O_{48}))(I_2)_{2.5}$	LTA	1989KIM/LEE
54069	Zeolite A	$(Co_{3.5}Na_5(Al_{12}Si_{12}O_{48}))(I_2)_5$	LTA	1989KIM/LEE
54070	Zeolite A	$Sr_{1.6}Tl_{8.8}(Al_{12}Si_{12}O_{48})$	LTA	1989YAN/PAR
54071	Zeolite A	$Sr_{5.45}Tl_{1.1}(Al_{12}Si_{12}O_{48})$	LTA	1989YAN/PAR
60597	Zeolite A	$Tl_{9.5}Na_{2.5}(Al_{12}Si_{12}O_{48})$	LTA	1983CHE/EDD
61438	Zeolite A	$(Ag_{4.16}(Si_3Al_3O_4)(H_2O)_{11.2})(AgNO_3)$	LTA	1985DIM/PET
62077	Zeolite A	$Cs_{12.5}Al_{12}Si_{12}O_{48}$	LTA	1987HEO/SEF2
62078	Zeolite A	$Cs_{12}Al_{12}Si_{12}O_{48}$	LTA	1987HEO/SEF2

TABLE 3. List of 269 zeolite entries belonging to the framework-type LTA—Continued

ICSD code	Mineral name	Chemical formula	FTC	Reference
63461	Zeolite A	$Ag_9Cs_{2.9}(Al_{12}Si_{12}O_{48})$	LTA	1987KIM/SEF
63462	Zeolite A	$Ag_{8.9}Cs_{2.6}(Al_{12}Si_{12}O_{48})$	LTA	1987KIM/SEF
63673	Zeolite A	$Ca_{3.84}Na_4Al_{12}Si_{12}O_{48}$	LTA	1987SIE/SCH
63674	Zeolite A	$Ca_{3.2}Na_{4.8}Al_{12}Si_{12}O_{48}(H_2O)_{14.9}O_{6.5}$	LTA	1987SIE/SCH
63675	Zeolite A	$Ca_{3.92}Na_{3.2}Al_{12}Si_{12}O_{48}O_{2.4}$	LTA	1987SIE/SCH
63676	Zeolite A	$Ca_{3.52}Na_4Al_{12}Si_{12}O_{48}(H_2O)_{14.2}$	LTA	1987SIE/SCH
63677	Zeolite A	$Ca_{3.68}Na_{4.64}Al_{12}Si_{12}O_{48}$	LTA	1987SIE/SCH
63678	Zeolite A	$Ca_{3.2}Na_4Al_{12}Si_{12}O_{48}(H_2O)_{10.5}$	LTA	1987SIE/SCH
65263	Zeolite A	$Ag_{10}Tl_2(Al_{12}Si_{12}O_{48})$	LTA	1988KIM/SON
65264	Zeolite A	$Ag_9Tl_3(Al_{12}Si_{12}O_{48})$	LTA	1988KIM/SON
65265	Zeolite A	$Ag_8Tl_4(Al_{12}Si_{12}O_{48})$	LTA	1988KIM/SON
65266	Zeolite A	$Ag_7Tl_5(Al_{12}Si_{12}O_{48})$	LTA	1988KIM/SON
65366	Zeolite A	$Ag_{4.6}Na_{7.4}(Al_{12}Si_{12}O_{48})$	LTA	1987KIM/SEF2
65367	Zeolite 4A	$Ag_{7.6}Na_{4.4}(Al_{12}Si_{12}O_{48})$	LTA	1987KIM/SEF3
65368	Zeolite A	$Cs_{12.94}(SiAlO_4)_{12}$	LTA	1987HEO/DEJ
65369	Zeolite A	$Cs_{12}(SiAlO_4)_{12}(Cs(OH))$	LTA	1987HEO/DEJ
66244	Zeolite A	$Ag_{10.7}K_{1.3}(Al_{12}Si_{12}O_{48})$	LTA	1988KIM/SON2
66245	Zeolite A	$Ag_{9.3}K_{2.7}(Al_{12}Si_{12}O_{48})$	LTA	1988KIM/SON2
66383	Zeolite 4A	$(Ca_6(Al_{12}Si_{12}O_{48}))(Br_2)_6$	LTA	1991JAN/HAN
66742	Zeolite A	$CaNa_{11.52}(Al_{11.09}Si_{11.47}O_{48})$	LTA	1993KAT/MOR
66743	Zeolite A	$CaNa_{11.44}(Al_{11.21}Si_{11.59}O_{48})$	LTA	1993KAT/MOR
67005	Zeolite A	$Mg_{2.5}Na_7Si_{12}Al_{12}O_{48}$	LTA	1989KIM/LEE2
67006	Zeolite A	$Mg_{1.5}Na_9Si_{12}Al_{12}O_{48}$	LTA	1989KIM/LEE2
67330	Zeolite A	$Ag_2Ca_5Al_{12}Si_{12}O_{48}$	LTA	1989SON/PAR
67331	Zeolite A	$Ag_7Ca_{2.5}Al_{12}Si_{12}O_{48}$	LTA	1989SON/PAR
67592	Zeolite A	$Rb_{12.61}(Si_{12}Al_{12}O_{48})$	LTA	1992SON/KIM
67621	Zeolite A	$Rb_{13.18}(Si_{12}Al_{12}O_{48})$	LTA	1992SON/KIM
67622	Zeolite A	$Rb_{13.48}(Si_{12}Al_{12}O_{48})$	LTA	1992SON/KIM
67623	Zeolite A	$Rb_{13.39}(Si_{12}Al_{12}O_{48})$	LTA	1992SON/KIM
67739	Zeolite A	$Cs_6Ca_3(Si_{12}Al_{12}O_{48})$	LTA	1992NAM/SEF
67740	Zeolite A	$Cs_{11.5}Ca_{0.5}(Si_{12}Al_{12}O_{48})$	LTA	1992NAM/SEF
67741	Zeolite A	$Cs_{12.5}(Si_{12}Al_{12}O_{48})$	LTA	1992NAM/SEF
68934	Zeolite A	$Cd_4Rb_4(Al_{12}Si_{12}O_{48})$	LTA	1990SON/KIM
68935	Zeolite A	$Cd_5Rb_2(Al_{12}Si_{12}O_{48})$	LTA	1990SON/KIM
68936	Zeolite A	$Cd_{5.95}Rb_{0.1}(Al_{12}Si_{12}O_{48})$	LTA	1990SON/KIM
68937	Zeolite A	$Tl_{3.4}Zn_{4.3}(Al_{12}Si_{12}O_{48})$	LTA	1990JEO/SON
68938	Zeolite A	$Tl_{5.5}Zn_{3.25}(Al_{12}Si_{12}O_{48})$	LTA	1990JEO/SON
69952	Zeolite A	$Cd_6(Si_{12}Al_{12}O_{48})$	LTA	1991KOH/KIM
69953	Zeolite A	$Cd_6(Si_{12}Al_{12}O_{48})(C_2H_4)_4$	LTA	1991KOH/KIM
71235	Zeolite A	$Ag_{2.8}Zn_{4.6}(Al_{12}Si_{12}O_{48})$	LTA	1991JEO/PAR
71236	Zeolite A	$(Ag_{2.8}Zn_{4.6}(Al_{12}Si_{12}O_{48}))(C_2H_4)_{5.6}$	LTA	1991JEO/PAR
71282	Zeolite A	$(CoBr_3)_4Na_4(Si_{12}Al_{12}O_{48})(Br_2)_2$	LTA	1991KIM/LEE
71283	Zeolite A	$(CoBr_3)_4Na_4(Si_{12}Al_{12}O_{48})(Br_2)_2$	LTA	1991KIM/LEE
71284	Zeolite A	$Rb_{11.75}Ag_{2.98}(Al_{12}Si_{12}O_{48})$	LTA	1991SON/KIM
71285	Zeolite A	$Rb_{11.85}Ag_{3.02}(Al_{12}Si_{12}O_{48})$	LTA	1991SON/KIM
71286	Zeolite A	$Rb_{11.66}Ag_{6.95}(Al_{12}Si_{12}O_{48})$	LTA	1991SON/KIM
73274	Zeolite A	$Pb_9O(OH)_4(Al_{12}Si_{12}O_{48})(H_2O)$	LTA	1993RON/SEF
73600	Zeolite A	$Ca_{5.6}Tl_{0.8}(Al_{12}Si_{12}O_{48})$	LTA	1993KIM/SON
73601	Zeolite A	$Ca_{1.4}Tl_{9.2}(Al_{12}Si_{12}O_{48})$	LTA	1993KIM/SON
73771	Zeolite A	$Ag_{5.6}K_{6.4}(Al_{12}Si_{12}O_{48})$	LTA	1993JEO/KIM
73969	Zeolite A	$K_{14.52}(Al_{14.52}Si_{9.48}O_{48})$	LTA	1993SUN/SEF
74017	Zeolite A	$Rb_{12.15}(Si_{12}Al_{12}O_{48})$	LTA	1993SON/KIM
74018	Zeolite A	$Rb_{13.38}(Si_{12}Al_{12}O_{48})$	LTA	1993SON/KIM
74394	Zeolite A	$Ag_{3.4}Rb_{11}(Al_{14.4}Si_{9.6}O_{48})$	LTA	1993KIM/JEO
74675	Zeolite A	$Cd_6(Si_{12}Al_{12}O_{48})$	LTA	1993JAN/KIM
74676	Zeolite A	$Cs_{12.5}(Si_{11.5}Al_{12.5}O_{48})$	LTA	1993JAN/KIM
75213	Zeolite A	$(Co_4Na_4(Al_{12}Si_{12}O_{48}))(CS_2)_4$	LTA	1994JAN/KIM2

TABLE 3. List of 269 zeolite entries belonging to the framework-type LTA—Continued

ICSD code	Mineral name	Chemical formula	FTC	Reference
75325	Zeolite 4A	$Cd_6(Al_{12}Si_{12}O_{48})$	LTA	1994JAN/KIM
75326	Zeolite 4A	$Rb_{13.5}(Si_{12}Al_{12}O_{48})$	LTA	1994JAN/KIM
75327	Zeolite A	$Cs_{2.87}Na_{8.7}(Si_{12}Al_{12}O_{48})$	LTA	1994CHO/KWO
75328	Zeolite A	$Cs_{2.87}Na_9(Si_{12}Al_{12}O_{48})(H_2O)_{22}$	LTA	1994CHO/KWO
75329	Zeolite A	$Cs_{2.86}Na_8H(Si_{12}Al_{12}O_{48})(H_2O)_{22}$	LTA	1994CHO/KWO
75937	Zeolite A	$Ag_{11.95}((AlSi)_{12}O_{48})(C_2H_4)_{3.5}(C_2H_4Br_2)_{1.25}$	LTA	1994JEO/JAN
78181	Zeolite A	$K_{11}((Si_{0.54}Al_{0.46})_{24}O_{48})$	LTA	1994ARM/AND2
78182	Zeolite A	$K_{10.592}((Si_{0.56}Al_{0.44})_{24}O_{48})$	LTA	1994ARM/AND2
78183	Zeolite A	$K_{10.76}((Si_{0.55}Al_{0.45})_{24}O_{48})$	LTA	1994ARM/AND2
78184	Zeolite A	$K_{13.48}((Si_{0.44}Al_{0.56})_{24}O_{48})$	LTA	1994ARM/AND2
78185	Zeolite A	$K_{15.68}((Si_{0.44}Al_{0.56})_{24}O_{48})$	LTA	1994ARM/AND2
78493	Zeolite A	$Co_4Na_4(Si_{12}Al_{12}O_{48})(CH_3OH)_{6.5}$	LTA	1994JAN/HAN
78495	Zeolite A	$Ag_{4.27}Cs_{12.67}(Si_{12}Al_{12}O_{48})$	LTA	1994SON/KIM
78496	Zeolite A	$Ag_{4.12}Cs_{12.40}(Si_{12}Al_{12}O_{48})$	LTA	1994SON/KIM
78566	Zeolite A	$K_{12.6}(Si_{12}Al_{12}O_{48})$	LTA	1994SUN/SEF
78568	Zeolite A	$Na_8Cs_{2.86}H_{1.14}(Al_{12}Si_{12}O_{48})$	LTA	1994HEO/CHO
78571	Zeolite A	$Cd_{11}(Al_{12}Si_{12}O_{48})$	LTA	1994HEO/CHO2
78573	Zeolite A	$Cs_{10.31}Na_{3.24}(Al_{12}Si_{12}O_{48})$	LTA	1994ARM/AND
79646	Zeolite A	$Ag_{3.3}Ca_{4.35}(Si_{12}Al_{12}O_{48})$	LTA	1993JAN/PAR
79647	Zeolite A	$(Ag_{3.3}Ca_{4.35}(Si_{12}Al_{12}O_{48}))(C_2H_4)_{6.65}$	LTA	1993JAN/PAR
80878	Zeolite A	$Ca_4Na_4(Al_{12}Si_{12}O_{48})$	LTA	1995JAN/SON
80879	Zeolite A	$(Ca_4Na_4(Al_{12}Si_{12}O_{48}))Br_{12}$	LTA	1995JAN/SON
80880	Zeolite A	$(Na_4Co_4(Al_{12}Si_{12}O_{48}))S_{16}$	LTA	1995YEO/SON
80882	Zeolite A	$Rb_3Na_8H(Al_{12}Si_{12}O_{48})$	LTA	1995PAR/YOO
80883	Zeolite A	$Rb_3Na_9(Al_{12}Si_{12}O_{48})$	LTA	1995PAR/YOO
80884	Zeolite A	$K_3Na_8H(Al_{12}Si_{12}O_{48})$	LTA	1995PAR/YOO
80885	Zeolite A	$K_3Na_9(Al_{12}Si_{12}O_{48})$	LTA	1995PAR/YOO
81942	Zeolite A	$Cs_3Na_8Ar_5(Al_{11}Si_{13}O_{48})$	LTA	1996HEO/LIM
81943	Zeolite A	$Cs_3Na_8Ar_6(Al_{11}Si_{13}O_{48})$	LTA	1996HEO/LIM
81962	Zeolite A	$(Co_4Na_4(Al_{12}Si_{12}O_{48}))(H_2S)_{11}$	LTA	1996YEO/KIM
82927	Zeolite A	$Na_{78.4}Ni_{3.84}(Si_{96}Al_{96}O_{384})(H_2O)_{212.48}$	LTA	1996HOR/OHN
83359	Zeolite A	$(Na_{12}(Al_{12}Si_{12}O_{48}))(H_2S)_{12}$	LTA	1996YEO/KIM2
84017	Zeolite A	$Cs_{7.32}Ag_{4.68}(Al_{12}Si_{12}O_{48})$	LTA	1984KIM/SEF
84018	Zeolite-A	$Na_6Ag_{5.91}H_{2.63}(Al_{12}Si_{12}O_{48})$	LTA	1984KIM/SEF2
85517	Zeolite Na-ZK-4	$(Na_{7.36}H_{1.64})Al_9Si_{15}O_{48}(H_2O)_{4.68}$	LTA	1986EDD/CHE
86203	Zeolite A	$In_8Si_{12}Al_{12}O_{48}(In)_{0.75}(S_2)$	LTA	1998HEO/KIM
86633	Zeolite A	$Li_{96}Al_{96}Si_{96}O_{384}$	LTA	1998POR/SOU
86634	Zeolite A	$(Li_{96}Al_{96}Si_{96}O_{384})(Li_2O)_{16}$	LTA	1998POR/SOU
86642	Zeolite LTA	$Na_{92.70}(Si_{96.96}Al_{95.04}O_{384})(H_2O)_{6.95}$	LTA	1998IKE/IZU
86643	Zeolite LTA	$Na_{92.71}(Si_{96.96}Al_{95.04}O_{384})(H_2O)_{44.5}$	LTA	1998IKE/IZU
86644	Zeolite LTA	$Na_{92.71}(Si_{96.96}Al_{95.04}O_{384})(H_2O)_{254.64}$	LTA	1998IKE/IZU
88329	Zeolite LTA	$Na_{94.75}(Al_{96}Si_{96}O_{384})(H_2O)_{39.17}$	LTA	1999HAS/NIS
88549	Zeolite A	$Cs_3Na_8H(Si_{12}Al_{12}O_{48})Xe_{2.5}$	LTA	1999HEO/LIM
88550	Zeolite A	$Cs_3Na_8H(Si_{12}Al_{12}O_{48})Xe_{4.5}$	LTA	1999HEO/LIM
88551	Zeolite A	$Cs_3Na_8H(Si_{12}Al_{12}O_{48})Xe_{5.25}$	LTA	1999HEO/LIM
89844	Zeolite A	$(Na_{12}(Al_{12}Si_{12}O_{48}))Xe_7$	LTA	2000LIM/PAR
89905	Zeolite LTA	$(Zn_{2.9}O_{2.7})Zn_6(Al_{12}Si_{12}O_{48})$	LTA	2000REA/GAM
89907	Zeolite LTA	$K_{128.08}(Si_{96.96}Al_{95.04}O_{384})$	LTA	2000IKE/KOD
91708	Zeolite A	$Cd_6Al_{12}Si_{12}O_{48}(C_3H_6)_4$	LTA	2000CHO/KIM2
92793	Zeolite A	$(Cs_3Na_8H(Si_{12}Al_{12}O_{48}))(Kr)_6$	LTA	2001LIM/CHA
95999	Zeolite A	$(In_{9.5}H_{0.5})(Si_{12}Al_{12}O_{48})(InSH)_{0.5}(H_2S)_{2.5}$	LTA	2002HEO/CHU
96000	Zeolite A	$(In_{8.4}H_{1.2})(Si_{12}Al_{12}O_{48})(In_2S)_{0.6}(H_2S)_2$	LTA	2002HEO/CHU
96001	Zeolite A	$(In_{9.8}H_{0.4})(Si_{12}Al_{12}O_{48})(InSH)_{0.4}(H_2S)$	LTA	2002HEO/CHU
96002	Zeolite A	$In_{10.2}(Si_{12}Al_{12}O_{48})(H_2S)_{0.8}$	LTA	2002HEO/CHU
97904	Zeolite ZK-4	$K_{88.32}H_{2.08}(Al_{90.4}Si_{101.6}O_{384})$	LTA	2003IKE/KOD
97905	Zeolite ZK-4	$K_{8.644}H_{0.856}(Al_{9.5}Si_{14.5}O_{48})$	LTA	2003IKE/KOD
97906	Zeolite ZK-4	$K_{6.67}H_{1.63}(Al_{8.3}Si_{15.7}O_{48})$	LTA	2003IKE/KOD

TABLE 3. List of 269 zeolite entries belonging to the framework-type LTA—Continued

ICSD code	Mineral name	Chemical formula	FTC	Reference
97907	Zeolite ZK-4	$K_{5.09}H_{1.41}(Al_{6.5}Si_{17.5}O_{48})$	LTA	2003IKE/KOD
98428	Zeolite LTA	$Rb_{100.64}K_{30.92}(Al_{96}Si_{96}O_{384})$	LTA	2001IKE/KOD
98429	Zeolite LTA	$Rb_{124.48}K_{9.41}(Al_{96}Si_{96}O_{384})$	LTA	2001IKE/KOD
108835	Zeolite A; desolvated	$(NiOH)_2(NH_4)_{10}(Al_{12}Si_{12}O_{48})(H_2O)_3$	LTA	1990PAT/SEF
108836	Zeolite A; solvated	$(NiOH)_2(NH_4)_{10}(Al_{12}Si_{12}O_{48})(H_2O)_{14}$	LTA	1990PAT/SEF
150092	Zeolite Linde Type A	$K_{2.8}K_{96}(Si_{96.96}Al_{95.04}O_{384})$	LTA	2004IKE/KOD
150093	Zeolite Linde Type A	$K_{22.4}K_{96}(Si_{96.96}Al_{95.04}O_{384})$	LTA	2004IKE/KOD
150094	Zeolite Linde Type A	$K_{38.4}K_{96}(Si_{96.96}Al_{95.04}O_{384})$	LTA	2004IKE/KOD
150096	Zeolite Linde Type A	$K_{51.2}K_{96}(Si_{96.96}Al_{95.04}O_{384})$	LTA	2004IKE/KOD
150097	Zeolite Linde Type A	$K_{39.2}K_{96}(Si_{96.96}Al_{95.04}O_{384})$	LTA	2004IKE/KOD
150098	Zeolite Linde Type A	$K_{41.6}K_{96}(Si_{96.96}Al_{95.04}O_{384})$	LTA	2004IKE/KOD
150099	Zeolite Linde Type A	$K_{46.4}K_{96}(Si_{96.96}Al_{95.04}O_{384})$	LTA	2004IKE/KOD
154396	Zeolite A; potassian	$(K_9(K_4Br))(Si_{12}Al_{12}O_{48})(Ag_4Br_4)_{0.75}$	LTA	2005LIM/CHO
200026	Zeolite A	$Rb_{11}Na(Al_{12}Si_{12}O_{48})$	LTA	1977FIR/SEF
200027	Zeolite A	$Rb_{11}Na(AlSiO_4)_{12}(H_2O)_7$	LTA	1977FIR/SEF
200148	Zeolite A	$Cs_7K_5Al_{12}Si_{12}O_{48}$	LTA	1977FIR/SEF3
200149	Zeolite A	$Ag_{12}Si_{12}Al_{12}O_{48}$	LTA	1977KIM/SEF
200150	Zeolite A	$Ag_{12}Si_{12}Al_{12}O_{48}$	LTA	1977KIM/SEF
200151	Zeolite A	$Si_{12}Al_{12}O_{48}Ag_8N_{27}H_{35}$	LTA	1977KIM/GIL
200152	Zeolite A	$Eu_{5.75}Na_{0.5}Si_{12}Al_{12}O_{48}$	LTA	1977FIR/SEF4
200253	Zeolite A	$Na_{12}Al_{12}Si_{12}O_{48}$	LTA	1977SUB/SEF
200272	Zeolite A	$(EuO)_{2.75}Eu_{1.75}Na_3Si_{12}Al_{12}O_{48}$	LTA	1978FIR/SEF3
200273	Zeolite A	$(EuCl_2)_4Eu_{1.48}NaSi_{12}Al_{12}O_{48}$	LTA	1978FIR/SEF4
200274	Zeolite A	$Ca_6Si_{12}Al_{12}O_{48}$	LTA	1978FIR/SEF2
200275	Zeolite A	$SrSi_2Al_2O_8$	LTA	1978FIR/SEF2
200276	Zeolite A	$H_{2.25}Ag_{12}Cl_{2.248}Si_{12}Al_{12}O_{48}(Cl_2)_6$	LTA	1978KIM/SEF3
200277	Zeolite A	$Si_{12}Al_{12}O_{48}Cd_{9.5}Cl_4(OH)_3$	LTA	1978MCC/SEF
200278	Zeolite A	$Si_{12}Al_{12}O_{48}Cd_{9.5}Cl_4(OH)_3(H_2O)_4$	LTA	1978MCC/SEF
200279	Zeolite A	$Ag_{7.48}Si_{12}Al_{12}O_{48}$	LTA	1978KIM/SEF4
200280	Zeolite A	$Ag_{11.888}Si_{12}Al_{12}O_{48}$	LTA	1978KIM/SEF4
200281	Zeolite A	$Ag_{10.94}Si_{12}Al_{12}O_{48}$	LTA	1978KIM/SEF4
200282	Zeolite A	$Ag_{12.464}Si_{12}Al_{12}O_{48}$	LTA	1978KIM/SEF4
200283	Zeolite A	$Ag_{11.48}Si_{12}Al_{12}O_{48}$	LTA	1978KIM/SEF4
200284	Zeolite A	$Ag_{9.26}Si_{12}Al_{12}O_{48}$	LTA	1978KIM/SEF4
200361	Zeolite A	$Co_4Na_4Si_{12}Al_{12}O_{48}(Cl_2)_4$	LTA	1978SUB/SEF
200362	Zeolite A	$Co_4Na_4Si_{12}Al_{12}O_{48}(Cl_2)_4$	LTA	1978SUB/SEF
200456	Zeolite A	$Tl_{13}(Al_{12}Si_{12}O_{48})(OH)(H_2O)_9$	LTA	1977FIR/SEF2
200457	Zeolite A	$Tl_{12}(Al_{12}Si_{12}O_{48})$	LTA	1977FIR/SEF2
200575	Zeolite A	$Ag_{12}Si_{12}Al_{12}O_{48}(H_2O)_3$	LTA	1978KIM/SEF
200576	Zeolite A	$Ag_{12}Si_{12}Al_{12}O_{48}(H_2O)_3$	LTA	1978KIM/SEF
200578	Zeolite A	$Ni_3Na_4(Si_{12}Al_{12}O_{48})O_9(H_2O)_{21}$	LTA	1978FIR/SEF
200579	Zeolite A	$Fe_{2.7}Na_2(Si_{12}Al_{12}O_{48})(H_2O)_{14.8}$	LTA	1978FIR/SEF
200581	Zeolite A	$K_{11.1}Si_{12}Al_{12}O_{48}$	LTA	1979PLU/SMI
200582	Zeolite A	$K_{11.41}(Al_{12}Si_{12}O_{48})$	LTA	1979PLU/SMI
200585	Zeolite A	$Cs_{9.24}Tl_{2.98}Si_{12}Al_{12}O_{48}$	LTA	1979SUB/SEF
201050	Zeolite A	$Ca_{5.13}Cs_{1.74}(Al_{12}Si_{12}O_{48})$	LTA	1980SUB/SEF
201051	Zeolite A	$Ca_{3.98}Cs_{4.04}(Al_{12}Si_{12}O_{48})$	LTA	1980SUB/SEF
201052	Zeolite A	$Ca_{3.37}Cs_{5.26}(Al_{12}Si_{12}O_{48})$	LTA	1980SUB/SEF

TABLE 3. List of 269 zeolite entries belonging to the framework-type LTA—Continued

ICSD code	Mineral name	Chemical formula	FTC	Reference
201053	Zeolite A	$Ca_3Cs_6(Al_{12}Si_{12}O_{48})$	LTA	1980SUB/SEF
201054	Zeolite A	$Ca_{2.8}Cs_{6.4}(Al_{12}Si_{12}O_{48})$	LTA	1980SUB/SEF
201078	Zeolite A	$Na_{12}Si_{12}Al_{12}O_{48}(NaNO_3)_{10}(H_2O)$	LTA	1981PET/MIO
201079	Zeolite A	$Li_{12}Si_{12}Al_{12}O_{48}(LiNO_3)_{11}$	LTA	1981PET/MIO
201184	Zeolite A	$Cd_{5.86}(Al_{12.29}Si_{11.71}O_{48})(H_2O)_{34.5}$	LTA	1981MCC/SEF
201185	Zeolite A	$Cd_6Al_{12}Si_{12}O_{48}(H_2O)_6$	LTA	1981MCC/SEF
201186	Zeolite A	$Cu_{7.52}(Al_{12}Si_{12}O_{48})O_3H_{5.76}$	LTA	1981LEE/SEF
201187	Zeolite A	$Cu_8(OH)_{2.25}(Al_{12}Si_{12}O_{48})$	LTA	1981LEE/SEF
201188	Zeolite A	$Cu_{7.56}(OH)_{1.35}Al_{12}Si_{12}O_{48}H_{3.68}$	LTA	1981LEE/SEF
201189	Zeolite A	$Cu_{5.68}(Al_{12}Si_{12}O_{48})$	LTA	1981LEE/SEF
201753	Zeolite A	$Na_{8.28}Mg_{1.8}(Al_{12}Si_{12}O_{48})(H_2O)_{.74}$	LTA	1986ADA/REE
202485	Zeolite A	$Cs_{8.5}Na_{3.5}(Al_{12}Si_{12}O_{48})Cs_{.5}$	LTA	1987HEO/SEF
202486	Zeolite A	$Cs_{12}(Al_{12}Si_{12}O_{48})Cs_{.5}$	LTA	1987HEO/SEF
202487	Zeolite A	$Cs_{12}(Al_{12}Si_{12}O_{48})Cs_{.5}$	LTA	1987HEO/SEF
280398	Zeolite A	$Ca_{48}(Al_{96}Si_{96}O_{384})$	LTA	2000POR/SOU
280399	Zeolite A	$Ca_{48}(Al_{96}Si_{96}O_{384})$	LTA	2000POR/SOU
280400	Zeolite A	$Ca_{51.33}(Al_{96}Si_{96}O_{384})$	LTA	2000POR/SOU
280401	Zeolite A	$Ca_{48}(Al_{96}Si_{96}O_{384})$	LTA	2000POR/SOU

TABLE 4. List of 72 zeolite entries belonging to the framework-type HEU

ICSD code	Mineral name	Chemical formula	FTC	Reference
4349	Clinoptilolite	$Ca_{3.16}Si_{36}O_{72}(H_2O)_{21.80}$	HEU	1975ALB
9262	Heulandite B	$Ca_{.8}Na_{.4}Al_2Si_7O_{18}(H_2O)_2$	HEU	1973ALB
10145	Clinoptilolite	$Na_{4.12}(Si_{36}O_{72})(H_2O)_{23.12}$	HEU	1975ALB
22050	Heulandite	$Ca_{0.6}(Al_{2.4}Si_{6.6}O_{18})(H_2O)_{4.77}$	HEU	1968MER/SLA
25029	Heulandite	$Ca_{1.16}(Al_2Si_{6.95}O_{18})(H_2O)_6$	HEU	1972ALB
27526	Heulandite	$Ca_{1.5}(Al_{2.394}Si_{6.597}O_{18})(H_2O)_6$	HEU	1967MER/SLA
31278	Heulandite	$(Na_{.26}K_{0.89}Ca_{3.37}Sr_{0.24}Ba_{0.03})Al_{9.48}Si_{26.61}O_{72}(H_2O)_{24.84}H_{1.03}$	HEU	1983ALB/VEZ
34179	Heulandite	$Ca_{3.0}Ag_{1.3}Al_{7.2}Si_{28.8}O_{72}(H_2O)_{17.5}$	HEU	1980BRE/CAL
34180	Heulandite	$Ca_{2.9}Na_{1.1}Al_{7.2}Si_{28.8}O_{72}(H_2O)_{20.5}$	HEU	1980BRE/CAL
37061	Heulandite	$K_{8.48}(Al_9Si_{27})O_{72}(H_2O)_{18}$	HEU	1983GAL/GOT
37062	Heulandite	$K_{6.92}(Al_9Si_{27})O_{72}(H_2O)_{9.7}$	HEU	1983GAL/GOT
37063	Heulandite	$K_{6.22}(Al_9Si_{27})O_{72}$	HEU	1983GAL/GOT
37064	Heulandite	$K_{7.06}(Al_9Si_{27})O_{72}$	HEU	1983GAL/GOT
38399	Heulandite	$Ca_{4.48}Al_{8.96}Si_{27.04}O_{72}(H_2O)_{24.5}$	HEU	1984HAM/TAY
40143	Heulandite	$K_{8.4}H_{.2}(Al_{8.6}Si_{27.4}O_{72})(H_2O)_{19.28}$	HEU	1996YAN/ARM
64767	Heulandite	$Ca_{1.23}(Al_2Si_7O_{18})(H_2O)_6$	HEU	1972ALB
66457	Clinoptilolite	$(Ca_{1.88}Mg_{.08}Na_4K_{.28})(Al_{8.16}Si_{27.84}O_{72})(H_2O)_{25.52}$	HEU	1991ARM/GUN
66458	Clinoptilolite	$(Ca_{1.8}Mg_{.16}Na_{4.24}K_{.28})(Al_{8.16}Si_{27.84}O_{72})(H_2O)_{24.88}$	HEU	1991ARM/GUN
66459	Clinoptilolite	$(Ca_{1.54}Mg_{.1}Na_{3.28}K_{.2})(Al_{8.16}Si_{27.84}O_{72})(H_2O)_{17.64}$	HEU	1991ARM/GUN
66460	Clinoptilolite	$(Ca_{1.32}Na_{3.12}K_{.72})(Al_{8.16}Si_{27.84}O_{72})(H_2O)_{15.92}$	HEU	1991ARM/GUN
66461	Clinoptilolite	$(Ca_{1.76}Na_{2.4}K_{.52})(Al_{8.16}Si_{27.84}O_{72})(H_2O)_{3.72}$	HEU	1991ARM/GUN
68258	Clinoptilolite	$Na_{2.88}K_{0.37}Mg_{0.80}Ca_{0.84}Ba_{0.15}(Al_{6.84}Si_{29.16}O_{72})(H_2O)_{20.48}$	HEU	1986SUG/TAK
68259	Heulandite	$Ca_{3.45}Rb_{1.5}(Al_{8.4}Si_{27.6}O_{72})(H_2O)_{23.5}$	HEU	1986SUG/TAK
69390	Clinoptilolite	$Na_{1.66}K_{2.56}Ca_{1.9}(Al_{5.48}Si_{30.52}O_{72})(H_2O)_{19.16}$	HEU	1990SMY/SPA
69391	Clinoptilolite	$Cs_{3.98}Ca_{1.2}(Al_{4.76}Si_{31.24}O_{72})(H_2O)_{14.56}$	HEU	1990SMY/SPA
72712	Clinoptilolite	$(Cs_{5.62}K_{0.44}Mg_{0.26})(Al_{6.58}Si_{29.42})O_{72}(H_2O)_{10.92}$	HEU	1991PET/FIL
73413	Clinoptilolite	$(Na_{0.28}Ca_{0.222})_4(Ba_{0.08}K_{0.42})_4(Al_{6.96}Si_{29.04}O_{72})(H_2O)_{6.72}$	HEU	1993ARM
73414	Clinoptilolite	$(Na_{0.21}Ca_{0.11})_4(Ba_{0.08}K_{0.53})_4(Al_{6.96}Si_{29.04}O_{72})(H_2O)_{5.16}$	HEU	1993ARM
73415	Clinoptilolite	$(Na_{0.19}Ca_{0.08})_4(Ba_{0.08}K_{0.54})_4(Al_{6.96}Si_{29.04}O_{72})(H_2O)_{4.84}$	HEU	1993ARM
75295	Heulandite	$Ca_{1.94}(Na_{0.91}Ca_{1.76})(Na_{0.39}K_{0.13})(Al_{8.9}Si_{27.1}O_{72})(H_2O)_{24.76}$	HEU	1994GUN/ARM
75296	Heulandite	$Na_{7.2}(Al_{8.9}Si_{27.1}O_{72})(H_2O)_{25.92}$	HEU	1994GUN/ARM

TABLE 4. List of 72 zeolite entries belonging to the framework-type HEU—Continued

ICSD code	Mineral name	Chemical formula	FTC	Reference
75297	Heulandite	$Pb_4(Al_{8.9}Si_{27.1}O_{72})(H_2O)_{16.44}$	HEU	1994GUN/ARM
82119	Heulandite	$Na_{5.68}Ca_{1.52}(Al_{8.6}Si_{27.4}O_{72})(H_2O)_{21.4}$	HEU	1996YAN/ARM
82120	Heulandite	$K_{8.4}(Al_{8.6}Si_{27.4}O_{72})(H_2O)_{19.28}$	HEU	1996YAN/ARM
82121	Heulandite	$Rb_{8.44}(Al_{8.6}Si_{27.4}O_{72})(H_2O)_{17.36}$	HEU	1996YAN/ARM
85696	Heulandite	$(NH_4)_{8.96}Al_{8.79}Si_{27.21}O_{72}(H_2O)_{19.52}$	HEU	1998YAN/ARM
87650	Heulandite	$Na_{1.56}H_{2.34}Al_{1.32}(Al_{7.86}Si_{28.14}O_{72})(H_2O)_{28.56}$	HEU	1999WUE/STO
87651	Heulandite	$Na_{1.52}H_{2.71}Al_{1.21}(Al_{7.86}Si_{28.14}O_{72})(H_2O)_{25.84}$	HEU	1999WUE/STO
87652	Heulandite	$Na_{0.76}H_{3.71}Al_{1.13}(Al_{7.86}Si_{28.14}O_{72})(H_2O)_{8.48}$	HEU	1999WUE/STO
87653	Heulandite	$Na_{0.52}H_{4.88}Al_{0.82}(Al_{7.86}Si_{28.14}O_{72})(H_2O)_{6.20}$	HEU	1999WUE/STO
87846	Clinoptilolite	$(Na_{1.32}K_{1.28}Ca_{1.72}Mg_{0.52})(Al_{6.77}Si_{29.23}O_{72})(H_2O)_{26.84}$	HEU	1999CAP/LAN
87847	Clinoptilolite	$(Na_{0.52}K_{2.44}Ca_{1.48})(Al_{6.59}Si_{29.41}O_{72})(H_2O)_{28.64}$	HEU	1999CAP/LAN
91669	Heulandite	$Cd_{4.11}(Al_{8.22}Si_{27.78}O_{72})(H_2O)_{29.6}$	HEU	2000STO/YAN
92924	Heulandite	$Na_{1.72}K_{0.4}Ca_{2.65}Ba_{0.03}Sr_{0.87}(Al_{8.92}Si_{27.08})O_{72}(H_2O)_{26}$	HEU	2001COM/GAT
92925	Heulandite	$Na_{1.72}K_{0.4}Ca_{2.65}Ba_{0.03}Sr_{0.87}(Al_{8.92}Si_{27.08})O_{72}(H_2O)_{26}$	HEU	2001COM/GAT
92926	Heulandite	$Na_{1.72}K_{0.4}Ca_{2.65}Ba_{0.03}Sr_{0.87}(Al_{8.92}Si_{27.08})O_{72}(H_2O)_{26}$	HEU	2001COM/GAT
92927	Heulandite	$Na_{1.72}K_{0.4}Ca_{2.65}Ba_{0.03}Sr_{0.87}(Al_{8.92}Si_{27.08})O_{72}(H_2O)_{26}$	HEU	2001COM/GAT
96825	Heulandite	$Sr_{4.23}(Al_{8.96}Si_{27.04}O_{72})(H_2O)_{25.76}$	HEU	2003DOE/ARM
96826	Heulandite	$Sr_{4.19}(Al_{8.96}Si_{27.04}O_{72})(H_2O)_{24.98}$	HEU	2003DOE/ARM
96827	Heulandite	$Sr_{4.16}(Al_{8.96}Si_{27.04}O_{72})(H_2O)_{18.58}$	HEU	2003DOE/ARM
96828	Heulandite	$Sr_{4.56}(Al_{8.96}Si_{27.04}O_{72})(H_2O)_{17.16}$	HEU	2003DOE/ARM
96829	Heulandite	$Sr_{3.46}(Al_{8.96}Si_{27.04}O_{72})(H_2O)_{16.6}$	HEU	2003DOE/ARM
97837	Clinoptilolite	$Cs_{7.39}(Al_6Si_{30}O_{72})(H_2O)_{7.39}$	HEU	2003JOH/OCO
97838	Clinoptilolite	$Cs_{7.1}(Al_6Si_{30}O_{72})$	HEU	2003JOH/OCO
97839	Clinoptilolite	$Cs_6(Al_6Si_{30}O_{72})$	HEU	2003JOH/OCO
97840	Clinoptilolite	$Na_8(Al_6Si_{30}O_{72})(H_2O)_{9.04}$	HEU	2003JOH/OCO
97841	Clinoptilolite	$Na_6(Al_6Si_{30}O_{72})$	HEU	2003JOH/OCO
97842	Clinoptilolite	$Na_6(Al_6Si_{30}O_{72})$	HEU	2003JOH/OCO
97899	Heulandite	$Cu_{3.62}(H_3O)_{1.36}(Al_8Si_{28}O_{72})(H_2O)_{28.88}$	HEU	2003ARM/SIM
97900	Heulandite	$(Cu_{2.44}(NH_3)_{5.44})(NH_4)_{3.72}(Al_8Si_{28}O_{72})(H_2O)_{22.08}$	HEU	2003ARM/SIM
97912	Heulandite	$Cd_{4.36}(Al_{8.7}Si_{27.3}O_{72})(H_2O)_{29.08}$	HEU	2003DOE/ARM2
97913	Heulandite	$Cd_{4.15}(Al_{8.7}Si_{27.3}O_{72})(H_2O)_{26.92}$	HEU	2003DOE/ARM2
97914	Heulandite	$Cd_{4.02}(Al_{8.7}Si_{27.3}O_{72})(H_2O)_{25.21}$	HEU	2003DOE/ARM2
97915	Heulandite	$Cd_{4.02}(Al_{8.7}Si_{27.3}O_{72})(H_2O)_{25.58}$	HEU	2003DOE/ARM2
97916	Heulandite	$Cd_{4.05}(Al_{8.7}Si_{27.3}O_{72})(H_2O)_{13.06}$	HEU	2003DOE/ARM2
100095	Clinoptilolite	$Ca_2Na_{2.24}K_{1.48}Mg_{.08}Al_6Si_{30}O_{72}(H_2O)_{22.76}$	HEU	1977KOY/TAK
100096	Clinoptilolite	$Ca_{1.24}Na_{1.84}K_{1.76}Mg_{.2}Al_6Si_{30}O_{72}(H_2O)_{21.32}$	HEU	1977KOY/TAK
100745	Heulandite	$Ca_{3.17}Na_2Al_{8.3}Si_{27.7}O_{72}$	HEU	1981MOR/PEA
151180	Heulandite	$((CH_3)NH_3)_{8.16}Na_{0.52}((Al_{8.7}Si_{27.3})O_{72})(H_2O)_{10.77}$	HEU	2000STO/ARM
151182	Heulandite	$((C_3H_7)NH_3)_{0.56}Na_{8.68}((Al_{8.7}Si_{27.3})O_{72})(H_2O)_{19.68}$	HEU	2000STO/ARM
151183	Heulandite	$((CH_3)_2NH_2)_{6.92}Na_{0.36}((Al_{8.7}Si_{27.3})O_{72})(H_2O)_{7.80}$	HEU	2000STO/ARM
201219	Heulandite	$Ag_{3.88}Si_{32.12}Al_{3.88}O_{72}(H_2O)_{15.72}$	HEU	1981BRE/CAL

TABLE 5. List of 71 zeolite entries belonging to the framework-type NAT

ICSD code	Mineral name	Chemical formula	FTC	Reference
8186	Scolecite	$CaAl_2Si_3O_{10}(H_2O)_3$	NAT	1979FAE/HAN
22016	Natrolite	$Na_2Al_2Si_3O_{10}(H_2O)_2$	NAT	1973PEA
22017	Natrolite	$Na_2Al_2Si_3O_{10}(H_2O)_2$	NAT	1973PEA
22018	Natrolite	$Na_2Al_2Si_3O_{10}(H_2O)_2$	NAT	1973PEA
22019	Natrolite	$Na_2Al_2Si_3O_{10}(H_2O)_2$	NAT	1973PEA
26542	Natrolite	$(Na_{15.68}Ca_{.32})(Al_{16.32}Si_{23.68}O_{80})(H_2O)_{16}$	NAT	1981ALB/VEZ
28369	Natrolite	$Na_2Al_2Si_3O_{10}(H_2O)_2$	NAT	1964TOR/BRO
29522	Gonnardite	$Na_{6.528}Ca_{1.472}(Al_{9.404}Si_{10.596}O_{40})(H_2O)_{11.936}$	NAT	1986MAZ/LAR
30967	Scolecite	$Ca(Al_2Si_3O_{10})(H_2O)_3$	NAT	1985KVI/STA
31303	Natrolite	$Na_2Al_2Si_3O_{10}(H_2O)_2$	NAT	1983HES

TABLE 5. List of 71 zeolite entries belonging to the framework-type NAT—Continued

ICSD code	Mineral name	Chemical formula	FTC	Reference
31309	Natrolite	$Na_2Al_2Si_3O_{10}(H_2O)_2$	NAT	1983PEC/SCH
32531	Natrolite	$Na_2Al_2Si_3O_{10}(H_2O)_2$	NAT	1981PEC
34890	Natrolite	$Na_2(Al_2Si_3O_{10})(H_2O)_2$	NAT	1960MEI
39904	Tetranatrolite	$Na_2(Si(Si_{0.5}Al_{0.5})_4O_{10})(H_2O)_2$	NAT	1995RAS
40645	Zeolite NAT Ga	$Na_2(Ga_2Si_3O_{10})(H_2O)_2$	NAT	1991MAL/DAD2
48139	Natrolite	$Na_2Al_2Si_3O_{10}(H_2O)_2$	NAT	1984ART/SMI
56657	Natrolite	$Na_2(Al_2Si_3O_{10})(H_2O)_2$	NAT	1996GHE/LEC
60187	Natrolite	$Na_2Al_2Si_3O_{10}(H_2O)_2$	NAT	1963GAB/LUN
61242	Mesolite	$Na_2Ca_2Al_6Si_9O_{30}(H_2O)_8$	NAT	1986ART/SMI
62293	Tetranatrolite	$Na_{2.05}K_{.22}Ca_{.02}Al_{2.25}Si_{2.75}O_{10}(H_2O)_2$	NAT	1986MIK/PUS
66041	Zeolite NAT	$Na_{1.94}(Ga_{1.94}Si_{3.06}O_{10})(H_2O)_2$	NAT	1988XIE/NEW
68317	Natrolite	$K_{15.8}Na_{0.2}(Al_{16}Si_{24}O_{80})(H_2O)_{16}$	NAT	1987YAM/KAM
68687	Zeolite NAT	$Na_{15.5}(Ga_{15.5}Si_{24.5}O_{80})(H_2O)_{16}$	NAT	1988XIE/NEW
69405	Natrolite	$Li_{1.66}Na_{0.34}(Al_2Si_3O_{10})(H_2O)_2$	NAT	1990BAU/KAS
69406	Natrolite	$Na_2(Al_2Si_3O_{10})(H_2O)_2$	NAT	1990BAU/KAS
69407	Natrolite	$K_2(Al_2Si_3O_{10})(H_2O)_2$	NAT	1990BAU/KAS
69409	Natrolite	$Na_2(Al_2Si_3O_{10})(H_2O)_2$	NAT	1990KRO/KRO
69410	Natrolite	$Na_2(Al_2Si_3O_{10})(H_2O)_2$	NAT	1990KRO/KRO
69411	Natrolite	$Na_2(Al_2Si_3O_{10})(H_2O)_2$	NAT	1990KRO/KRO
69412	Natrolite	$Li_2(Al_2Si_3O_{10})(H_2O)_2$	NAT	1990KRO/KRO
71818	Gonnardite	$(Na_{5.84}Ca_{1.6})(Al_9Si_{11}O_{40})(H_2O)_{9.87}$	NAT	1991ART/TOR
71819	Gonnardite	$(Na_{5.84}Ca_{1.6})(Al_9Si_{11}O_{40})(H_2O)_{12.36}$	NAT	1991ART/TOR
71820	Gonnardite	$(Na_{5.84}Ca_{1.6})(Al_9Si_{11}O_{40})(H_2O)_{14.17}$	NAT	1991ART/TOR
71821	Gonnardite	$(Na_{5.84}Ca_{1.6})(Al_9Si_{11}O_{40})(H_2O)_{14}$	NAT	1991ART/TOR
71822	Gonnardite	$K_9(Al_9Si_{11}O_{40})(H_2O)_{20.48}$	NAT	1991ART/TOR
74219	Natrolite	$Na_{1.98}(Al_{1.99}Si_{2.97}O_{10.15})(H_2O)_{2.00}$	NAT	1993STU/JOS
75199	Mesolite	$(Na_{5.22}Ca_{5.22})(Al_{16}Si_{24}O_{80})(H_2O)_{11.31}$	NAT	1994STA/THO
75200	Mesolite	$(Na_{4.96}Ca_{4.96})(Al_{16}Si_{24}O_{80})(H_2O)_{23.36}$	NAT	1994STA/THO
79847	Natrolite	$Na_{16}(Al_{15.416}Si_{24.584})O_{80}(H_2O)_{16}$	NAT	1995ALB/CRU
81195	Natrolite	$Na_2(Al_2Si_3O_{10})(H_2O)_2$	NAT	1995FIN/FLE
83013	Natrolite	$Na_2(Al_2Si_3O_{10})$	NAT	1996BAU/JOS
83014	Natrolite	$Na_2(Al_2Si_3O_{10})$	NAT	1996BAU/JOS
83015	Natrolite	$Na_{1.74}(Al_2Si_3O_{10})(H_2O)_{1.5}$	NAT	1996BAU/JOS
87687	Gonnardite	$Na_{4.64}Ca_{1.84}(Al_{8.5}Si_{11.5})O_{40}(H_2O)_{13.6}$	NAT	1999ART/GAL
89797	Tetranatrolite	$Na_{6.80}Ca_{1.20}(Al_{8.68}Si_{11.32})O_{40}(H_2O)_{10.88}$	NAT	2000EVA/KON
90038	Mesolite	$Na_2Ca_2(Al_6Si_9O_{30})(H_2O)_8$	NAT	2000STU/KIR
91663	Zeolite NAT	$K_{7.98}(Ga_{7.98}Si_{12.02}O_{40})(H_2O)_{6.32}$	NAT	2000LEE/KIM5
94914	Natrolite	$Na_{16}(Al_{16}Si_{24}O_{80})(H_2O)_{16}$	NAT	2002LEE/VOG
94915	Natrolite	$Na_{16}(Al_{16}Si_{24}O_{80})(H_2O)_{16}$	NAT	2002LEE/VOG
94916	Natrolite	$Na_{16}(Al_{16}Si_{24}O_{80})(H_2O)_{32}$	NAT	2002LEE/VOG
94917	Natrolite	$Na_{16}(Al_{16}Si_{24}O_{80})(H_2O)_{32}$	NAT	2002LEE/VOG
94918	Natrolite	$Na_{16}(Al_{16}Si_{24}O_{80})(H_2O)_{32}$	NAT	2002LEE/VOG
94919	Natrolite	$Na_{16}(Al_{16}Si_{24}O_{80})(H_2O)_{32}$	NAT	2002LEE/VOG
94920	Natrolite	$Na_{16}(Al_{16}Si_{24}O_{80})(H_2O)_{32}$	NAT	2002LEE/VOG
95391	Scolecite	$Ca(Al_2Si_3O_{10})(H_2O)_3$	NAT	2002COM/GAT
95392	Scolecite	$Ca(Al_2Si_3O_{10})(H_2O)_3$	NAT	2002COM/GAT
95393	Scolecite	$Ca(Al_2Si_3O_{10})(H_2O)_3$	NAT	2002COM/GAT
95394	Scolecite	$Ca(Al_2Si_3O_{10})(H_2O)_3$	NAT	2002COM/GAT
171057	Tetranatrolite	$Na_{1.462}Ca_{.474}(Si_{2.685}Al_{2.315})O_{10}(H_2O)_{2.74}$	NAT	2005LEE/HRI
171058	Tetranatrolite	$Na_{1.462}Ca_{.474}(Si_{2.685}Al_{2.315})O_{10}(H_2O)_{2.37}$	NAT	2005LEE/HRI
171059	Tetranatrolite	$Na_{1.462}Ca_{.474}(Si_{2.685}Al_{2.315})O_{10}(H_2O)_{2.102}$	NAT	2005LEE/HRI
171060	Tetranatrolite	$Na_{1.462}Ca_{.474}(Si_{2.685}Al_{2.315})O_{10}(H_2O)_2$	NAT	2005LEE/HRI
171061	Tetranatrolite	$Na_{1.462}Ca_{.474}(Si_{2.685}Al_{2.315})O_{10}(H_2O)_{0.402}$	NAT	2005LEE/HRI
171824	Paranatrolite	$Na_2Al_2Si_3O_{10}(H_2O)_3$	NAT	2005LEE/HRI2
172121	Natrolite	$(Na_{1.92}Mg_{.06}Ca_{.02})Al_2Si_3O_{10}(D_2O)_{1.84}$	NAT	2005SER/BAK
172621	Tetranatrolite	$Na_{1.462}Ca_{.474}(Si_{2.685}Al_{2.315})O_{10}(H_2O)_{2.74}$	NAT	2006LEE/HRI

TABLE 5. List of 71 zeolite entries belonging to the framework-type NAT—Continued

ICSD code	Mineral name	Chemical formula	FTC	Reference
172622	Tetranatrolite	$Na_{1.462}Ca_{.474}(Si_{2.685}Al_{2.315})O_{10}(H_2O)_4$	NAT	2006LEE/HRI
172623	Tetranatrolite	$Na_{1.462}Ca_{.474}(Si_{2.685}Al_{2.315})O_{10}(H_2O)_4$	NAT	2006LEE/HRI
172624	Tetranatrolite	$Na_{1.462}Ca_{.474}(Si_{2.685}Al_{2.315})O_{10}(H_2O)_4$	NAT	2006LEE/HRI
201650	Natrolite	$Na_2Al_2Si_3O_{10}(H_2O)_2$	NAT	1984KIR/ORT
201651	Natrolite	$Na_2Al_2Si_3O_{10}(H_2O)_2$	NAT	1984KIR/ORT

TABLE 6. List of 67 zeolite entries belonging to the framework-type RHO

ICSD code	Mineral name	Chemical formula	FTC	Reference
23708	Zeolite Rho	$H_{12}(Al_{12}Si_{36}O_{96})$	RHO	1973ROB/SHO
35572	Zeolite Rho	$D_{4.8}Cs_{5.5}Si_{37.7}Al_{10.3}O_{96}$	RHO	1983PAR/PRI
35573	Zeolite Rho	$D_{4.8}Cs_{5.5}Si_{37.7}Al_{10.3}O_{96}$	RHO	1983PAR/PRI
35574	Zeolite Rho	$D_{4.8}Cs_{5.5}Si_{37.7}Al_{10.3}O_{96}$	RHO	1983PAR/PRI
40507	Zeolite D2O-Rho	$D_{10.3}Si_{37.7}Al_{10.3}O_{96}(D_2O)_{8.4}$	RHO	1984PAR/GIE
40508	Zeolite D2O-Rho	$Cs_{4.2}D_{6.1}Si_{37.7}Al_{10.3}O_{96}$	RHO	1984PAR/GIE
62393	Zeolite D-Rho	$D_9Al_9Si_{39}O_{96}$	RHO	1987BAU/FIS
62394	Zeolite D-Rho	$D_9Al_9Si_{39}O_{96}$	RHO	1987BAU/FIS
62395	Zeolite D-Rho	$D_9Al_9Si_{39}O_{96}$	RHO	1987BAU/FIS
62396	Zeolite D-Rho	$D_9(Al_9Si_{39}O_{96})$	RHO	1987BAU/FIS
62691	Zeolite D-Rho	$Cs_{1.1}Al_{4.8}Si_{44.8}O_{96}$	RHO	1986FIS/BAU
63657	Zeolite D-Rho	$D_{6.9}Al_6Si_{42}O_{96}Al_8O_{4.6}$	RHO	1988FIS/BAU
63658	Zeolite D-Rho	$D_{8.4}Cs_{1.7}Al_{5.5}(Al_6Si_{42}O_{96})O_{4.9}$	RHO	1988FIS/BAU
63659	Zeolite D-Rho	$D_{12}Al_6Si_{42}O_{96}$	RHO	1988FIS/BAU
65440	Zeolite Rho	$Na_{6.2}Cs_{3.2}Si_{36.4}Al_{11.6}O_{96}(D_2O)_{6.2}$	RHO	1989BAU/BIE
65671	Zeolite Rho	$D_{2.5}(ND_4)_{7.4}Cs_{.7}(Al_{10.9}Si_{37.1}O_{96})$	RHO	1989FIS/BAU
65672	Zeolite Rho	$D_{4.95}(ND_4)_{4.6}Cs_{.55}(Al_{10.1}Si_{37.9}O_{96})$	RHO	1989FIS/BAU
66063	Zeolite Rho	$Ca_{3.95}(ND_4)_{4.1}(Al_{12}Si_{36}O_{96})$	RHO	1990COR/ABR
66064	Zeolite Rho	$Ca_{3.95}(ND_4)_{4.1}(Al_{12}Si_{36}O_{96})$	RHO	1990COR/ABR
66065	Zeolite Rho	$Ca_{3.4}D_{5.2}(Al_{12}Si_{36}O_{96})$	RHO	1990COR/ABR
68127	Zeolite Rho	$Cs_{.42}Al_{2.6}(Al_{8.59}Si_{39.41}O_{96})(H_2O)_{4.2}$	RHO	1988GAM/RAY
68128	Zeolite Rho	$Cs_{.42}Al_{2.6}(Al_{8.59}Si_{39.41}O_{96})(H_2O)_{4.2}(CH_3Cl)_{2.6}$	RHO	1988GAM/RAY
68129	Zeolite Rho	$Cs_{.42}Al_{2.6}(Al_{8.59}Si_{39.41}O_{96})(H_2O)_{4.2}(CH_3Cl)_{2.5}$	RHO	1988GAM/RAY
68130	Zeolite Rho	$Cs_{.42}Al_{2.6}(Al_{8.59}Si_{39.41}O_{96})(H_2O)_{4.2}(CH_3Cl)_{2.4}$	RHO	1988GAM/RAY
68131	Zeolite Rho	$Cs_{.42}Al_{2.6}(Al_{8.59}Si_{39.41}O_{96})(H_2O)_{4.2}(CH_3Cl)_2$	RHO	1988GAM/RAY
68132	Zeolite Rho	$Cs_{.42}Al_{2.6}(Al_{8.59}Si_{39.41}O_{96})(H_2O)_{4.2}(CH_3Cl)_{1.7}$	RHO	1988GAM/RAY
69111	Zeolite Rho	$Sr_{4.4}Cs_{1.0}H_{2.2}(Al_{12}Si_{36}O_{96})$	RHO	1991BIE/BAU
69112	Zeolite Rho	$Sr_{4.0}Cs_{1.1}(Al_{12}Si_{36}O_{96})$	RHO	1991BIE/BAU
71430	Pahasapaite	$Ca_8Li_8(Be_{24}P_{24}O_{96})(H_2O)_{38}$	RHO	1991COR/ABR
71431	Pahasapaite	$Ca_{5.18}Li_{13.64}(Be_{24}P_{24}O_{96})$	RHO	1991COR/ABR
71804	Zeolite Rho	$Sr_{4.5}(NH_4)_{1.9}Cs_{1.1}(Al_{12}Si_{36}O_{96})$	RHO	1991BIE/BAU2
71805	Zeolite Rho	$Sr_{4.6}(NH_4)_{1.7}Cs_{1.1}(Al_{12}Si_{36}O_{96})$	RHO	1991BIE/BAU2
72372	Zeolite Rho	$Rb_{24}(Be_{24}As_{24}O_{96})(D_2O)_{3.2}$	RHO	1992PAR/COR
72373	Zeolite Rho	$Rb_{14}(Al_{14}Si_{34}O_{96})$	RHO	1992PAR/COR
73461	Zeolite Rho	$Cs_{1.13}(NH_4)_{10.5}(Al_{12}Si_{36}O_{96})$	RHO	1993BIE/BAU
73462	Zeolite Rho	$Cs_{0.58}(NH_4)_{10}Al_{12}Si_{36}O_{96}$	RHO	1993BIE/BAU
74366	Zeolite Rho	$Cs_{0.22}Cd_{4.8}(Al_{11}Si_{37}O_{96})$	RHO	1991PAR/LIU
74367	Zeolite Rho	$Cs_{0.22}Cd_{4.8}(Al_{11}Si_{37}O_{96})$	RHO	1991PAR/LIU
75205	Zeolite Rho	$Tl_{9.92}(Al_{9.92}Si_{38.08}O_{96})(D_2O)_{1.2}$	RHO	1994PAR/COR
75206	Zeolite Rho	$Tl_{21.18}(Be_{24}P_{24}O_{96})$	RHO	1994PAR/COR
75207	Zeolite Rho	$Rb_{11.75}(Be_{24}P_{24}O_{96})$	RHO	1994PAR/COR
75208	Zeolite Rho	$Tl_{17.72}(Be_{24}As_{24}O_{96})$	RHO	1994PAR/COR
75210	Pahasapaite	$Ca_6Li_{12}(Be_{24}P_{24}O_{96})$	RHO	1994PAR/COR
75211	Pahasapaite	$Ca_6Li_{12}(Be_{24}P_{24}O_{96})$	RHO	1994PAR/COR
75212	Pahasapaite	$Ca_6Li_{12}(Be_{24}P_{24}O_{96})$	RHO	1994PAR/COR
80051	Zeolite ECR 10	$Cs_{8.8}Na_{9.8}(Ga_{21.42}Si_{26.58}O_{96})$	RHO	1995NEW/VAU

TABLE 6. List of 67 zeolite entries belonging to the framework-type RHO—Continued

ICSD code	Mineral name	Chemical formula	FTC	Reference
84580	Zeolite Rho	$(H_{3.2}Cs_{0.8}(Al_9Si_{39}O_{96}(H_2O)_{28})(H_2O)_{22.6})(H_2N(CH_3))_5$	RHO	1997WEI/FIS
84581	Zeolite Rho	$(H_{0.1}Cs_{0.9}(Al_6Si_{42}O_{96}(H_2O)_{27.2}))(H_2N(CH_3))_5$	RHO	1997WEI/FIS
84582	Zeolite Rho	$(D_{3.65}Cs_{0.2}(Al_9Si_{39}O_{96})(Al_2O_3)_4)(D_2N(CD_3))_{5.15}$	RHO	1997WEI/FIS
84583	Zeolite Rho	$(D_{3.8}Cs_{0.2}(Al_9Si_{39}O_{96}))(D_2N(CD_3))_5$	RHO	1997WEI/FIS
84584	Zeolite Rho	$(H_{8.45}Cs_{0.55}(Al_9Si_{39}O_{96}(H_2O)_{19.2}))(H_2O)_{18.7}((CH_3)(NH_2))_9$	RHO	1997WEI/FIS
84585	Zeolite Rho	$(D_{0.3}Cs_{0.7}(Al_6Si_{42}O_{96})(Al_2O_3)_{3.567})(D_2N(CD_3))_5$	RHO	1997WEI/FIS
84586	Zeolite Rho	$(D_{0.3}Cs_{0.7}(Al_6Si_{42}O_{96}))(D_2N(CD_3))_5$	RHO	1997WEI/FIS
84587	Zeolite Rho	$(H_{3.4}Cs_{0.6}(Al_9Si_{39}O_{96})(H_2O)_{40.6})(HN(CH_3)_2)_5$	RHO	1997WEI/FIS2
84588	Zeolite Rho	$(H_{7.6}Cs_{1.4}(Al_9Si_{39}O_{96})(H_2O)_{25})(HN(CH_3)_2)_9$	RHO	1997WEI/FIS2
84589	Zeolite Rho	$(H_5Cs(Al_6Si_{42}O_{96})(H_2O)_{29.2})(HN(CH_3)_2)_5$	RHO	1997WEI/FIS2
84590	Zeolite Rho	$(H_{2.8}Cs_{1.2}(Al_9Si_{39}O_{96})(H_2O)_{30})(N(CH_3)_3)_5$	RHO	1997WEI/FIS3
84591	Zeolite Rho	$(D_{3.8}Cs_{0.2}(Al_9Si_{39}O_{96})(Al_2O_3)_{5.367})(N(CD_3)_3)_5$	RHO	1997WEI/FIS3
84592	Zeolite Rho	$(H_{0.2}Cs_{0.8}(Al_6Si_{42}O_{96})(H_2O)_{26})(N(CH_3)_3)_5$	RHO	1997WEI/FIS3
84593	Zeolite Rho	$(D_{0.3}Cs_{0.7}(Al_6Si_{42}O_{96})(Al_2O_3)_{5.1})(N(CD_3)_3)_5$	RHO	1997WEI/FIS3
201470	Zeolite Rho	$H(AlSi_3O_8)$	RHO	1984MCC
201471	Zeolite Rho; dehydrated	$(NH_4)Cs_{0.025}(AlSi_3O_8)$	RHO	1984MCC
201876	Zeolite Rho	$Cs_{2.7}D_{7.3}Si_{38}Al_{10}O_{96}$	RHO	1984PAR/ABR
201877	Zeolite Rho	$Cs_{3.78}D_{6.22}Si_{38}Al_{10}O_{96}$	RHO	1984PAR/ABR
201878	Zeolite Rho	$Cs_{3.78}D_{6.22}Si_{38}Al_{10}O_{96}$	RHO	1984PAR/ABR
201879	Zeolite Rho	$Cs_{3.78}D_{6.22}Si_{38}Al_{10}O_{96}$	RHO	1984PAR/ABR
203065	Pahasapaite	$(Na_{0.2}K_{1.2}Ca_{5.5}Li_{3.6})Li_8Be_{24}(PO_4)_{24}(H_2O)_{38}$	RHO	1989ROU/PEA

TABLE 7. List of 63 zeolite entries belonging to the framework-type CHA

ICSD code	Mineral name	Chemical formula	FTC	Reference
18197	Chabazite	$Ca_{1.95}(Al_{3.9}Si_{8.1}O_{24})(H_2O)_{13}$	CHA	1963SMI/RIN
23913	Chabazite	$Ca_{2.02}(Al_{3.9}Si_{8.1}O_{24})$	CHA	1962SMI
29070	Chabazite	$Na_{0.15}Ca_{0.9}(Al_{1.95}Si_{4.05}O_{12})(H_2O)_6$	CHA	1958DEN/SMI2
30873	Willhendersonite	$KCa(Al_3Si_3O_{12})(H_2O)_5$	CHA	1984TIL/FIS
31261	Chabazite	$(Ca_{1.39}Na_{.27}K_{.21})(Si_{8.844}Al_{3.156}O_{24})(H_2O)_{12.95}$	CHA	1983MAZ/GAL
31262	Chabazite	$(Ca_{1.39}Na_{.27}K_{.21})(Si_{8.82}Al_{3.17})O_{24}(H_2O)_{12.95}$	CHA	1983MAZ/GAL
31263	Chabazite	$(Na_{1.45}Ca_{1.03}K_{0.38}Sr_{0.07}Ba_{0.02}Mg_{0.01}Fe_{0.01})(Si_{7.9}Al_{4.1}O_{24})(H_2O)_{12.57}$	CHA	1983MAZ/GAL
32553	Chabazite	$Ca_{1.36}Sr_{0.3}(Al_{3.8}Si_{8.3}O_{24})(H_2O)_{7.68}$	CHA	1982CAL/NAR
33249	Chabazite	$K_{4.16}(Al_{3.8}Si_{8.2}O_{24})(H_2O)_{7.23}$	CHA	1983CAL/NAR
33250	Chabazite	$Ag_{3.7}(Al_{3.8}Si_{8.2}O_{24})(H_2O)_{5.4}$	CHA	1983CAL/NAR
34172	Chabazite	$Ca(Al_2Si_2O_8)Cl_2$	CHA	1964FAN/SMI
34173	Chabazite	$Ca((Al_2Si_4)O_{12})(Cl_3)$	CHA	1964FAN/SMI
34174	Chabazite	$Ca((Al_2Si_4)O_{12})(Cl_3)$	CHA	1964FAN/SMI
34297	Chabazite	$H_{3.1}Ca_{0.25}(Al_{3.60}Si_{8.40}O_{24})$	CHA	1979MOR/KIN
34298	Chabazite	$H_{3.24}Ca_{0.18}(Al_{3.60}Si_{8.40}O_{24})$	CHA	1979MOR/KIN
34654	Chabazite	$Ca_2Al_4Si_8O_{24}(H_2O)_{13}$	CHA	1964SMI/KNO
34655	Chabazite	$Ca_2Al_4Si_8O_{24}(H_2O)_{13}$	CHA	1964SMI/KNO
35320	Chabazite	$Ca_{1.5}((Al_2Si_4)O_{12})Cl$	CHA	1961FAN
36323	Chabazite	$CaNa(Al_3Si_3O_{12})(H_2O)_6$	CHA	1958DEN/SMI
39704	Chabazite	$Ca_{1.76}(Al_{3.7}Si_{8.3}O_{24})(H_2O)_{7.6}$	CHA	1993BUT/SHE
39705	Chabazite	$Ca_{1.78}(Al_{3.7}Si_{8.3}O_{24})$	CHA	1993BUT/SHE
39778	Chabazite	$Ca_{0.19}Li_{3.3}(Al_{3.7}Si_{8.3}O_{24})(H_2O)_{7.7}$	CHA	1994BUT/SHE
40410	Phosphate-chabazite	$Al_6(Si_{1.4}P_{4.6})O_{24}(H_2O)_{2.5}((C_4H_9)(CH_3)(NH))_{1.4}$	CHA	1989PLU/SMI
55448	Chabazite	$Ca_{1.56}(Al_{3.7}Si_{8.3}O_{24})(H_2O)_{1.73}Se_{0.84}$	CHA	2003SMO/SHE
61053	Zeolite ZYT-6	$((H_3O)(Al_4SiP_3O_{16}))_{0.5}(H_2O)_{0.36}$	CHA	1985ITO/SHI
62599	Chabazite	$Mn_{1.98}Al_{3.72}Si_{8.28}O_{33.66}H_{19.32}$	CHA	1985CAL/MEZ

TABLE 7. List of 63 zeolite entries belonging to the framework-type CHA—Continued

ICSD code	Mineral name	Chemical formula	FTC	Reference
62600	Chabazite	$Mn_{1.9}Al_{3.8}Si_{8.3}O_{24}$	CHA	1985CAL/MEZ
62692	Chabazite	$Cs_{2.96}Ca_{0.46}Al_{3.6}Si_{8.4}O_{24}(H_2O)_{5.04}$	CHA	1986CAL/MEZ
62693	Chabazite	$Cs_{2.98}Ca_{0.43}Al_{3.6}Si_{8.4}O_{24}$	CHA	1986CAL/MEZ
63528	Chabazite	$K_{0.87}(Al_{1.54}Si_{4.46}O_{12})(H_2O)_{4.82}$	CHA	1985BEL/MAK
63529	Chabazite	$K_{0.815}(Al_{1.54}Si_{4.46}O_{12})$	CHA	1985BEL/MAK
64693	Chabazite	$Ca_{1.979}Al_{3.8}Si_{8.2}O_{24}(CO)_{1.828}$	CHA	1977MOR/PLU
83266	Zeolite HSAPO-34	$(D_3O)_{6.048}D_{0.738}(AlP_{0.78}Si_{0.22}O_4)_{18}$	CHA	1996SMI/CHE
84255	Chabazite	$D_{2.934}((Si_{33.92}Al_{2.08})O_{72})$	CHA	1997SMI/DAV
85448	Willhendersonite; Ca-pure	$Ca_{1.45}(Al_3Si_3O_{12})(H_2O)_{5.76}$	CHA	1997VEZ/QUA
85586	Chabazite	SiO_2	CHA	1998DIA/BAR
90140	Chabazite	$Ca_{1.74}(Al_{3.48}Si_{8.52})O_{24}(H_2O)_{18.15}$	CHA	2000GUA2
90148	Chabazite	$Li_{3.53}(Al_{3.53}Si_{8.47}O_{24})$	CHA	2000SMI/ECK
90149	Chabazite	$(Li_{2.05}Na_{1.61})(Al_{3.53}Si_{8.47}O_{24})$	CHA	2000SMI/ECK
97228	Chabazite-Mg	$(Ca_{0.85}K_{0.66})Mg_{0.66}(Al_{3.31}Si_{8.69}O_{24})(H_2O)_{13.22}$	CHA	2002PAS/FER
100104	Chabazite	$Ca_{1.979}(Al_{3.8}Si_{8.2}O_{24})$	CHA	1977MOR/PLU3
100105	Chabazite	$(Ca_{1.97}Al_{3.8}Si_{8.2}O_{24})(CO)_{1.83}$	CHA	1977MOR/PLU
100146	Chabazite	$Na_{15.2}Al_{15.2}Si_{32.8}O_{96}$	CHA	1977MOR/PLU2
100224	Chabazite	$Cu_{1.82}K_{0.2}(Al_{3.9}Si_{8.1}O_{24})$	CHA	1977PLU/SMI
100225	Chabazite	$Cu_{0.918}K_{0.2}(Al_{3.9}Si_{8.1}O_{24})(H_2O)_{16.86}$	CHA	1977PLU/SMI
100382	Chabazite	$Na_{15.56}Al_{15.2}Si_{32.8}O_{96}$	CHA	1977MOR/PLU2
100386	Chabazite	$Ca_{1.979}(Al_{3.8}Si_{8.2}O_{24})$	CHA	1977MOR/PLU3
201125	Chabazite	$(NH_4)_{3.24}Ca_{0.25}Al_{3.60}Si_{8.40}O_{24}(H_2O)_{1.26}$	CHA	1979MOR/KIN
201126	Chabazite	$(NH_4)_{3.24}Ca_{0.18}Al_{3.60}Si_{8.40}O_{24}(H_2O)_{12.84}$	CHA	1979MOR/KIN
201458	Chabazite	$Ba_{1.4}(Al_{3.72}Si_{8.28}O_{24})(H_2O)_{7.4}$	CHA	1982CAL/NAR2
201459	Chabazite	$Cd_{1.68}(Si_{8.28}Al_{3.72}O_{24})(H_2O)_{10.56}$	CHA	1982CAL/NAR2
201463	Chabazite	$K_{0.17}Mg_{0.4}Ca_{1.6}Sr_{0.34}(Al_{3.84}Si_{8.16}O_{24})(H_2O)_{15.04}$	CHA	1982ALB/GAL
201464	Chabazite	$Na_{3.16}(Al_{3.72}Si_{8.28}O_{24})(H_2O)_{9.68}$	CHA	1982ALB/GAL
201465	Chabazite	$Na_{0.44}K_{3.02}(Al_{3.6}Si_{8.4}O_{24})(H_2O)_{10.02}$	CHA	1982ALB/GAL
201466	Chabazite	$Ca_{1.76}(Al_{3.6}Si_{8.4}O_{24})(H_2O)_{9.87}$	CHA	1982ALB/GAL
201467	Chabazite	$Sr_{2.03}(Al_{3.6}Si_{8.4}O_{24})(H_2O)_{10.4}$	CHA	1982ALB/GAL
201584	Zeolite ZK-14	$Na_{14.4}Si_{24.9}Al_{11.1}O_{72}(H_2O)_{39}$	CHA	1984CAR/MEI
201585	Zeolite ZK-14	$Na_{12.8}(Al_{7.2}Si_{16.8}O_{48})(H_2O)_{6.84}$	CHA	1984CAR/MEI
201586	Zeolite ZK-14	$Na_{9.52}(Al_{7.2}Si_{16.8}O_{48})(H_2O)_{5.88}$	CHA	1984CAR/MEI
201589	Chabazite	$Ag_{3.38}Al_{3.7}Si_{8.3}O_{24}$	CHA	1984CAL/MEZ
201593	Chabazite	$Co_{1.9}(Al_4Si_8O_{24})(H_2O)_{5.8}$	CHA	1984CAL/NAR
201594	Chabazite	$Co_{1.67}Na_{0.21}(Al_4Si_8O_{24})$	CHA	1984CAL/NAR
201595	Zeolite K-ZK-14	$K_{11.08}Si_{25.2}Al_{10.8}O_{72}(H_2O)_{8.1}$	CHA	1984CAR/KEL

TABLE 8. List of 226 zeolite entries belonging to nine distinct framework types (ANA, EDI, FER, GIS, KFI, LAU, LTL, MFI, MOR) with population $19 \leqslant n \leqslant 33$

ICSD code	Mineral name	Chemical formula	FTC	Reference
40643	Zeolite ANA Ga	$Na(GaSi_2O_6)(H_2O)$	ANA	1991MAL/DAD
40644	Zeolite ANA Ga	$Na(GaSi_2O_6)(H_2O)$	ANA	1991MAL/DAD
54152	Wairakite	$Ca(Al_2Si_4O_{12})(H_2O)_2$	ANA	1998HEN/BEL
69663	Zeolite ANA	$Cs_{5.96}Na_{7.92}(Ga_{13.87}Si_{34.13}O_{96})(H_2O)_{10.05}$	ANA	1990YEL/XIE
69664	Zeolite ANA	$Cs_{5.96}Na_{7.92}(Ga_{13.87}Si_{34.13}O_{96})$	ANA	1990YEL/XIE
69665	Zeolite ANA	$Cs_{6.81}Na_{7.10}(Ga_{13.92}Si_{34.09}O_{96})(H_2O)_{9.2}$	ANA	1990YEL/XIE
69666	Zeolite ANA	$Cs_{6.81}Na_{7.10}(Ga_{13.92}Si_{34.09}O_{96})$	ANA	1990YEL/XIE
80612	Zeolite ANA	$Cs(AlSiO_4)$	ANA	1991DIM/DON
86687	Zeolite GaGe-ANA1	$(NH_4)(GaGe_2O_6)$	ANA	1998BU/FEN
86688	Zeolite GaGe-ANA2	$Cs(GaGe_2O_6)$	ANA	1998BU/FEN

TABLE 8. List of 226 zeolite entries belonging to nine distinct framework types (ANA, EDI, FER, GIS, KFI, LAU, LTL, MFI, MOR) with population 19 ≤n≤33—Continued

ICSD code	Mineral name	Chemical formula	FTC	Reference
93116	Zeolite ANA	$(NH_4)(Zn(H_2O))(ZnAsO_4)_3$	ANA	2001FEN/ZHA
98197	Wairakite	$Ca_{0.959}(Al_2Si_4O_{12})(H_2O)_{1.82}$	ANA	2003SER/JOS
98198	Wairakite	$Ca_{0.928}Na_{0.06}(Al_2Si_4O_{12})(H_2O)_2$	ANA	2003SER/JOS
98199	Wairakite	$Ca_{0.922}Na_{0.08}(Al_2Si_4O_{12})(H_2O)_2$	ANA	2003SER/JOS
98200	Wairakite	$Ca_{0.946}(Al_2Si_4O_{12})(H_2O)_{0.62}$	ANA	2003SER/JOS
98201	Wairakite	$Ca_{0.958}(Al_2Si_4O_{12})$	ANA	2003SER/JOS
100553	Wairakite	$Ca_{7.19}Na_{1.13}(Si_{32.72}Al_{15.28}O_{96})(H_2O)_{16}$	ANA	1979TAK/MAZ
153259	Zeolite ANA	$(NH_4)_{16}(Zn_{16}B_8P_{24}O_{96})$	ANA	2005YAN/YU
153260	Zeolite ANA	$(NH_4)_{16}(Zn_{13.4}Co_{2.6}B_8P_{24}O_{96})$	ANA	2005YAN/YU
323	Edingtonite 1Q	$Ba_{2.02}(Al_{4.03}Si_{5.97}O_{20})(H_2O)_{7.81}$	EDI	1976GAL
331	Zeolite K-F	$K_{13.5}(OH)_3(H_2O)_{13}(Si_{10}Al_{10}O_{40})$	EDI	1976TAM/BOS
6272	Zeolite F	$Na_5Si_5Al_5O_{20}(H_2O)_9$	EDI	1974BAE/BAR
28036	Zeolite F	$Rb_{9.8}(Al_{10}Si_{10}O_{40})(H_2O)_{13}$	EDI	1974BAE/BAR
29516	Edingtonite 1O	$Ba(Al_2Si_3O_{10})(H_2O)_{3.46}$	EDI	1986BEL/GAB
29517	Edingtonite 1O	$Ba(Al_2Si_3O_{10})(H_2O)_{3.46}$	EDI	1986BEL/GAB
30689	Edingtonite 1Q	$Ba_{1.952}(Al_{3.9}Si_{6.1}O_{20})(H_2O)_{7.4}$	EDI	1984MAZ/GAL
30690	Edingtonite 1Q	$Ba_{1.88}(Al_{3.88}Si_{6.12}O_{20})(H_2O)_{7.51}$	EDI	1984MAZ/GAL
31133	Edingtonite	$Tl_4(Al_4Si_6O_{20})(H_2O)_5$	EDI	1935TAY
38408	Edingtonite 1O	$Ba_2(Al_4Si_6O_{20})(H_2O)_7$	EDI	1983KVI/SMI
67104	Zeolite F	$Li_{5.04}Si_5Al_5O_{20}(H_2O)_{7.92}$	EDI	1989SHE/BUT
84242	Zeolite N	$K_{11.64}(Al_{10}Si_{10}O_{40})Cl_{1.828}(H_2O)_8$	EDI	1997NOR/FJE
91664	Zeolite EDI	$Rb_{6.98}Na_{1.11}(Ga_{7.99}Si_{12.01}O_{40})(H_2O)_{3.32}$	EDI	2000LEE/KIM5
151404	Edingtonite	$Ba(Al_2Si_3O_{10})(H_2O)_4$	EDI	1933TAY/JAC
151491	Edingtonite	$Ba_{1.98}(Al_4Si_6O_{20})(H_2O)_{6.84}$	EDI	2004GAT/BOF
171840	Edingtonite	$Ba_{.94}(Si_{3.04}Al_{1.96})O_{10}(H_2O)_{3.54}$	EDI	2004GAT/BAL
171841	Edingtonite	$Ba_{.91}(Si_{3.04}Al_{1.96})O_{10}(H_2O)_{3.32}$	EDI	2004GAT/BAL
171842	Edingtonite	$Ba_{.88}(Si_{3.04}Al_{1.96})O_{10}(H_2O)_{3.32}$	EDI	2004GAT/BAL
171843	Edingtonite	$Ba_{.89}(Si_{3.04}Al_{1.96})O_{10}(H_2O)_{3.32}$	EDI	2004GAT/BAL
30929	Ferrierite	$Na_{0.2}K_{0.8}Ca_{0.5}Mg_2(Al_7Si_{29}O_{72})(H_2O)_{22.64}$	FER	1984GRA/MEI
35082	Ferrierite	$Na_{1.554}K_{.296}Mg_2(Si_{30.15}Al_{5.85}O_{72})(H_2O)_{18}$	FER	1966VAU
36193	Ferrierite	$Na_{1.5}Mg_2Si_{30.5}Al_{5.5}O_{72}(H_2O)_{18}$	FER	1966VAU
40532	Ferrierite M	$Na_3KMg_{0.5}(Al_5Si_{31}O_{72})(H_2O)_{18}$	FER	1985GRA/GRA
40883	Ferrierite	$Mg_2K_{1.64}(Al_{6.4}Si_{29.68})O_{72}(H_2O)_{23.12}$	FER	1987ALB/SAB
54109	Ferrierite	$K_{3.34}(H_3O)_{0.55}(Al_4Si_{32}O_{72})$	FER	1989PIC/MAD
65497	Ferrierite Al-free	SiO_2	FER	1987GIE/GUN
67007	Ferrierite	$K_{3.34}Al_4Si_{32}O_{72.55}$	FER	1989PIC/MAD
75475	Ferrierite	SiO_2	FER	1994MOR/WEI
75476	Ferrierite	SiO_2	FER	1994MOR/WEI
84188	Ferrierite	$K_{3.34}H_{1.76}O_{0.55}(Al_4Si_{32}O_{72})$	FER	1989PIC/MAD
91684	Ferrierite	$Ni_{1.92}(Al_{3.8}Si_{32.2}O_{72})(H_2O)_{18.46}$	FER	2000DAL/CRU
91685	Ferrierite	$Ni_{1.82}(Al_{3.8}Si_{32.2}O_{72})(H_2O)_{0.68}$	FER	2000DAL/CRU
93962	Ferrierite	$Mg_{1.6}Na_{2.6}(Al_4Si_{32}O_{72})(H_2O)_{18}$	FER	2001YOK/WAC
97918	Ferierite	$Co_{1.34}H_{1.13}(Al_{3.81}Si_{32.19}O_{72})(H_2O)_{16.76}$	FER	2003DAL/ALB2
97919	Ferierite	$Co_{2.04}(Al_{3.81}Si_{32.19}O_{72})(H_2O)_{17.4}$	FER	2003DAL/ALB2
97920	Ferierite	$Co_{2.02}(Al_{3.81}Si_{32.19}O_{72})(H_2O)_{17.12}$	FER	2003DAL/ALB2
99355	Ferrierite	$Co_{1.8}Na_{0.2}(Al_{3.8}Si_{32.2}O_{72})(H_2O)_{18}$	FER	2003DAL/ALB
99356	Ferrierite	$Co_{1.8}Na_{0.2}(Al_{3.8}Si_{32.2}O_{72})(H_2O)_{3.73}$	FER	2003DAL/ALB
99357	Ferrierite	$Co_{1.62}Na_{0.61}(Al_{3.8}Si_{32.2}O_{72})$	FER	2003DAL/ALB
281217	Ferrierite	$Si_{36}O_{72}$	FER	2003BUL/LIG
281218	Ferrierite	$Si_{36}O_{72}$	FER	2003BUL/LIG
281219	Ferrierite	$Si_{36}O_{72}$	FER	2003BUL/LIG
281220	Ferrierite	$Si_{36}O_{72}$	FER	2003BUL/LIG
281221	Ferrierite	$Si_{36}O_{72}$	FER	2003BUL/LIG
281222	Ferrierite	$Si_{36}O_{72}$	FER	2003BUL/LIG

TABLE 8. List of 226 zeolite entries belonging to nine distinct framework types (ANA, EDI, FER, GIS, KFI, LAU, LTL, MFI, MOR) with population 19 ≤n≤33—Continued

ICSD code	Mineral name	Chemical formula	FTC	Reference
281223	Ferrierite	$Si_{36}O_{72}$	FER	2003BUL/LIG
281224	Ferrierite	$Si_{36}O_{72}$	FER	2003BUL/LIG
281225	Ferrierite	$Si_{36}O_{72}$	FER	2003BUL/LIG
281226	Ferrierite	$Si_{36}O_{72}$	FER	2003BUL/LIG
281227	Ferrierite	$Si_{36}O_{72}$	FER	2003BUL/LIG
281228	Ferrierite	$Si_{36}O_{72}$	FER	2003BUL/LIG
281229	Ferrierite	$Si_{36}O_{72}$	FER	2003BUL/LIG
6313	Gismondine	$((CH_3)_4N)(AlSi_3O_8)$	GIS	1970BAE/MEI
8253	Amicite	$K_4Na_4(Al_8Si_8O_{32})(H_2O)_{11.06}$	GIS	1979ALB/VEZ
9550	Zeolite P1	$Na_6Al_6Si_{10}O_{32}(H_2O)_{12}$	GIS	1972BAE/MEI
15838	Gismondine	$CaAl_2Si_2O_8(H_2O)_4$	GIS	1963FIS
27324	Gismondine	$Ca_{.92}(Al_{1.8}Si_{2.2}O_8)(H_2O)_{4.32}$	GIS	1971FIS/SCH
30975	Gobbinsite	$Ca_{.6}Na_{2.6}K_{2.25}Al_6Si_{10}O_{32}(H_2O)_{12}$	GIS	1985MCC/BAE
40421	Zeolite $MAPO_4$3	$(Al_{5.8}Mg_{2.2})P_8O_{32}(NC_6H_{16})_{2.2}$	GIS	1989PLU/SMI2
42384	Zeolite SAPO-43	$((C_3H_7)NH_3)Al_2(PO_4)_2$	GIS	1993HEL/KAU
42385	Zeolite SAPO-43	$((C_3H_7)NH_3)Al_2(PO_4)_2$	GIS	1993HEL/KAU
55910	Gismondine	$(K_{7.2}Na_{0.8})(Al_8Ge_8O_{32})(H_2O)_{13.33}$	GIS	2004CEL/PAR
61439	Gismondine	$Ca_4(Al_8Si_8O_{32.18})(H_2O)_{17.5}$	GIS	1985RIN/VEZ
61440	Gismondine	$Ca_4(Al_8Si_8O_{31.9})(H_2O)_{18}$	GIS	1985RIN/VEZ
66327	Garronite	$Na_{.8}Ca_{2.82}(Al_6Si_{10}O_{32})(H_2O)_{12.08}$	GIS	1992ART
66328	Garronite	$Ca_{3.49}(Al_6Si_{10}O_{32})(H_2O)_{12.56}$	GIS	1992ART
66857	Garronite	$Ca_{2.8}(Al_{5.66}Si_{10.34}O_{32})(H_2O)_{13.76}$	GIS	1997SCH/JOS
66858	Garronite	$Ca_{2.8}(Al_{5.66}Si_{10.34}O_{32})(H_2O)_{13.76}$	GIS	1997SCH/JOS
66859	Garronite	$Ca_{2.83}(Al_{5.66}Si_{10.34}O_{32})(H_2O)_{7.1}$	GIS	1997SCH/JOS
68503	Zeolite P	$Na_{3.552}(Al_{3.6}Si_{12.4}O_{32})(H_2O)_{10.656}$	GIS	1990HAK/FAE
68504	Zeolite P2	$Na_4(Al_4Si_{12}O_{32})(H_2O)_{14}$	GIS	1990HAN/HAK
73272	Gismondine	$Ca_4(Al_8Si_8O_{32})(H_2O)_{16}$	GIS	1993VEZ/QUA
73273	Gismondine	$Ca_4(Al_8Si_8O_{32})(H_2O)_8$	GIS	1993VEZ/QUA
75969	Gobbinsite	$Na_4Ca_{0.94}(Si_{10.4}Al_{5.6}O_{32})(H_2O)_{16.185}$	GIS	1994ART/FOY
85511	Gismondine	$Ca_4(Al_8Si_8O_{32})(H_2O)_{17.21}$	GIS	1986ART/RIN
87552	Zeolite CaP	$Ca_4(Al_8Si_8O_{32})(H_2O)_{18.664}$	GIS	1998ALB/CHE
87553	Zeolite NaP	$Na_8(Al_8Si_8O_{32})(H_2O)_{15.17}$	GIS	1998ALB/CHE2
89333	Garronite	$Ca_{2.89}(Al_{5.84}Si_{10.16}O_{32})(H_2O)_{16.32}$	GIS	1998ART/MAR
97902	Zeolite P	$Mn_{3.92}(Al_8Si_8O_{32})(H_2O)_{16}$	GIS	2003NER/MAS
97903	Zeolite P	$Cd_4(Al_8Si_8O_{32})(H_2O)_{17.35}$	GIS	2003NER/MAS
9547	Zeolite P	$(Ba_{13.42}Al_{30}Si_{66}O_{192})(BaCl_2)_{8.22}$	KFI	1972BAR/ROB
9548	Zeolite Q	$(Ba_{5.12}Al_{30}Si_{66}O_{192})(BaBr_2)_{7.92}$	KFI	1972BAR/ROB
9549	Zeolite P	$(Na_{15}Ba_{7.5}Al_{30}Si_{66}O_{192})(NaBa_{.5}Cl_2)_{1.7}(H_2O)_{72}$	KFI	1972BAR/ROB
22054	Zeolite ZK-5	$Na_{30}(Al_{30}Si_{66}O_{192})(H_2O)_{98}$	KFI	1965MEI/KOK
22055	Zeolite ZK-5	$Na_{30}Al_{30}Si_{66}O_{192}(H_2O)_{98}$	KFI	1965MEI/KOK
31369	Zeolite ZK5	$Cs_{9.7}K_{13}Si_{73.2}Al_{22.8}O_{192}$	KFI	1983PAR/SHA
31370	Zeolite ZK5	$Cs_{9.0}K_{11.8}Si_{73.2}Al_{22.8}O_{192}$	KFI	1983PAR/SHA
31371	Zeolite ZK5	$D_{17.5}Cs_{3.9}K_{0.8}Si_{73.8}Al_{22.2}O_{192}$	KFI	1983PAR/SHA
31372	Zeolite ZK5	$D_{13}Cs_6K_{2.7}Si_{74.3}Al_{21.7}O_{192}$	KFI	1983PAR/SHA
67759	Zeolite KFI	$Na_{21.66}H_{1.4}(Al_{22.4}Si_{73.6}O_{192})$	KFI	1992LIE/VER
67760	Zeolite KFI	$Na_{22.13}H_{1.4}(Al_{22.4}Si_{73.6}O_{192})$	KFI	1992LIE/VER
67761	Zeolite KFI	$Na_{21.24}H_{1.4}(Al_{22.4}Si_{73.6}O_{192})$	KFI	1992LIE/VER
67762	Zeolite KFI	$Na_{3.5}H_{19.9}(Al_{22.4}Si_{73.6}O_{192})$	KFI	1992LIE/VER
67763	Zeolite KFI	$K_{21.84}(Al_{22.4}Si_{73.6}O_{192})$	KFI	1992LIE/VER
67764	Zeolite KFI	$K_{22.14}(Al_{22.4}Si_{73.6}O_{192})$	KFI	1992LIE/VER
67765	Zeolite KFI	$K_{19.67}(Al_{22.4}Si_{73.6}O_{192})$	KFI	1992LIE/VER
67766	Zeolite KFI	$K_{18.62}(Al_{22.4}Si_{73.6}O_{192})$	KFI	1992LIE/VER
85514	Zeolite D-ZK-5	$Cs_{6.3}D_{6.7}Al_{5.90}(Al_{13}Si_{83}O_{192})$	KFI	1986FIS/BAU2
85515	Zeolite D-ZK-5	$Cs_{6.1}D_{3.5}Al_{1.6}(Al_{9.6}Si_{86.4}O_{192})$	KFI	1986FIS/BAU2

TABLE 8. List of 226 zeolite entries belonging to nine distinct framework types (ANA, EDI, FER, GIS, KFI, LAU, LTL, MFI, MOR) with population 19 ≤n≤33—Continued

ICSD code	Mineral name	Chemical formula	FTC	Reference
6314	Laumontite	$Ca(Al_2Si_4O_{12})(H_2O)_3$	LAU	1970BAR
16535	Laumontite	$Ca_{0.89}(Al_2Si_4O_{12})(H_2O)_{1.88}$	LAU	1971SCH/FIS
20473	Laumontite	$CaAl_2Si_4O_{12}(H_2O)_2$	LAU	1967AMI/ILY
24457	Laumontite	$Ca(Al_2Si_4O_{12})(H_2O)_2$	LAU	1967BAR/FIS
63502	Laumontite	$(Ca(Al_2Si_4O_{12})(H_2O)_{2.8})(H_2O)_{0.5}$	LAU	1985YAK/SIM
66689	Laumontite	$Ca_4(Al_8Si_{16}O_{48})(D_2O)_{22}$	LAU	1993STA/ART
67923	Laumontite	$Ca_4(Al_8Si_{16}O_{48})(H_2O)_{18}$	LAU	1993ART/STA
67924	Laumontite	$Ca_4(Al_8Si_{16}O_{48})(H_2O)_{18}$	LAU	1993ART/STA
68450	Laumontite	$K_{.10}Na_{.30}Ca_{3.60}(Si_{16.40}Al_{7.60}O_{48})(H_2O)_{12.5}$	LAU	1989ART/SMI
68451	Laumontite	$K_{.10}Na_{.30}Ca_{3.60}(Si_{16.40}Al_{7.60}O_{48})(H_2O)_{14}$	LAU	1989ART/SMI
72914	Laumontite	$Ca_{0.916}K_{0.058}(Al_2Si_4O_{12})(H_2O)_{4.31}$	LAU	1992ARM/KOH
72915	Laumontite	$Ca_{0.89}K_{0.07}Al_2Si_4O_{12}(H_2O)_{3.59}$	LAU	1992ARM/KOH
72916	Laumontite	$Ca_{0.958}K_{0.028}Al_2Si_4O_{12}(H_2O)_{3.06}$	LAU	1992ARM/KOH
72917	Laumontite	$Ca_{0.95}K_{0.03}Al_2Si_4O_{12}(H_2O)_{2.92}$	LAU	1992ARM/KOH
83020	Laumontite	$Ca_4(Al_8Si_{16}O_{48})(H_2O)_{16.9}$	LAU	1996STA/ART
83021	Laumontite	$Ca_4(Al_8Si_{16}O_{48})(H_2O)_{13.86}$	LAU	1996STA/ART
83022	Laumontite	$Ca_4(Al_8Si_{16}O_{48})(H_2O)_{12.16}$	LAU	1996STA/ART
83023	Laumontite	$Ca_4(Al_8Si_{16}O_{48})(H_2O)_{8.5}$	LAU	1996STA/ART
83024	Laumontite	$Ca_4(Al_8Si_{16}O_{48})(H_2O)_{7.34}$	LAU	1996STA/ART
83817	Leonhardite	$Ca_{3.16}K_{0.76}Na_{0.89}(Al_{7.63}Si_{15.18}O_{48})(H_2O)_{9.05}$	LAU	1997BAU/JOS
85176	Laumontite	$Na_{1.85}K_{1.85}Ca_{2.15}(Al_8Si_{16}O_{48})(H_2O)_{13.48}$	LAU	1997STO/ARM
96813	Laumontite	$Ca(Al_2Si_4O_{12})(H_2O)_{3.126}$	LAU	2003FRI/BIS
96814	Laumontite	$Ca(Al_2Si_4O_{12})(H_2O)_{3.522}$	LAU	2003FRI/BIS
96815	Laumontite	$Ca(Al_2Si_4O_{12})(H_2O)_{4.323}$	LAU	2003FRI/BIS
172233	Laumontite	$CaAl_2Si_4O_{12}(H_2O)_{3.02}$	LAU	2004LEE/HRI
172234	Laumontite	$CaAl_2Si_4O_{12}(H_2O)_{4.5}$	LAU	2004LEE/HRI
172235	Laumontite	$CaAl_2Si_4O_{12}(H_2O)_{4.5}$	LAU	2004LEE/HRI
172236	Laumontite	$CaAl_2Si_4O_{12}(H_2O)_{4.5}$	LAU	2004LEE/HRI
172237	Laumontite	$CaAl_2Si_4O_{12}(H_2O)_{4.5}$	LAU	2004LEE/HRI
172238	Laumontite	$CaAl_2Si_4O_{12}(H_2O)_{4.5}$	LAU	2004LEE/HRI
172239	Laumontite	$CaAl_2Si_4O_{12}(H_2O)_{4.5}$	LAU	2004LEE/HRI
9851	Zeolite G;L	$K_{2.19}Ba_{7.70}Al_{18}Si_{18}O_{72}(H_2O)_{27.6}$	LTL	1972BAE/BAR
18099	Zeolite L	$K_{5.1}Na_{4.2}(Al_9Si_{27}O_{72})(H_2O)_{20.8}$	LTL	1969BAR/VIL
30120	Zeolite L	$K_{5.40}Na_{4.30}Al_9Si_{27}O_{71.80}(H_2O)_{21}$	LTL	1969BAR/VIL
63619	Zeolite L	$K_{10}Ga_9Si_{27}O_{72}$	LTL	1986NEW
67029	Zeolite L	$K_{9.95}Al_{1.56}Si_{34.44}O_{72}$	LTL	1989NEW
67030	Zeolite L	$K_{9.71}Al_{1.68}Si_{34.32}O_{72}$	LTL	1989NEW
67031	Zeolite L	$K_{11.7}Al_{1.8}Si_{34.2}O_{72}$	LTL	1989NEW
69403	Perlialite	$K_{7.56}Tl_{3.80}(Al_{12}Si_{24}O_{72})(H_2O)_{22.46}$	LTL	1990ART/KVI
69404	Perlialite	$K_{7.45}Tl_{3.81}(Al_{12}Si_{24}O_{72})(H_2O)_{21.38}$	LTL	1990ART/KVI
69414	Zeolite L	$K_{4.63}Na_6(Al_{10.63}Si_{25.38}O_{72})(H_2O)_{19.32}$	LTL	1990SAT/MOR
69415	Zeolite L	$K_{4.64}Sr_{1.46}(Al_{7.56}Si_{28.44}O_{72})(H_2O)_{11.94}$	LTL	1990SAT/MOR
69416	Zeolite L	$K_{4.86}Ba_{1.14}(Al_{7.13}Si_{28.87}O_{72})(H_2O)_{18.36}$	LTL	1990SAT/MOR
69417	Zeolite L	$K_5Cs_{3.66}(Al_{8.64}Si_{27.36}O_{72})(H_2O)_{8.22}$	LTL	1990SAT/MOR
74170	Zeolite L	$K_{9.72}(Al_{7.32}Si_{28.08}O_{72})(H_2O)_{25.5}$	LTL	1992HIR/KAT
74171	Zeolite L	$K_{5.75}(Al_{1.43}Si_{33.49}O_{72})(H_2O)_{25.5}$	LTL	1992HIR/KAT
77399	Zeolite L; potassian	$K_{9.3}Al_{9.3}Si_{26.7}O_{72}$	LTL	1994AND/ARM
77400	Zeolite L; potassian	$K_{1.2}K_{9.3}Al_{9.3}Si_{26.7}O_{72}$	LTL	1994AND/ARM
84468	Zeolite L	$K_{9.38}(Al_9Si_{27}O_{72})$	LTL	1997AND/ARM
84469	Zeolite L	$K_{10.58}(Al_9Si_{27}O_{72})$	LTL	1997AND/ARM
84470	Zeolite L	$K_{11.72}(Al_9Si_{27}O_{72})$	LTL	1997AND/ARM
84471	Zeolite L	$K_{13.64}(Al_9Si_{27}O_{72})$	LTL	1997AND/ARM

TABLE 8. List of 226 zeolite entries belonging to nine distinct framework types (ANA, EDI, FER, GIS, KFI, LAU, LTL, MFI, MOR) with population 19 ≤n≤33—Continued

ICSD code	Mineral name	Chemical formula	FTC	Reference
34299	Zeolite ZSM5	$Na_{1.1}Al_{1.1}Si_{94.9}O_{192}(H_2O)_{2.36}$	MFI	1981OLS/KOK
40926	Zeolite ZSM-5	$Si_{12}O_{24}$	MFI	1986TAY/MIL
40942	Pentasil	$(Si_{96}O_{192})(C_8H_{10})_3$	MFI	1987MEN/VIG
40943	Pentasil	$(Si_{96}O_{192}(H_2O)_2)(C_6H_6)_2$	MFI	1987MEN
41051	Silicalite	$(Si_{96}O_{192})(C_8H_{10})_{1.93}(H_2O)_3$	MFI	1992MEN
41052	Silicalite	$(Si_{96}O_{192}(H_2O)_{1.4})(C_7H_7Cl)_{3.22}$	MFI	1992MEN
41053	Silicalite	$(Si_{96}O_{192}(H_2O)_{1.3})(C_6H_4Cl_2)_{2.03}$	MFI	1992MEN
41054	Silicalite	$(Si_{96}O_{192})(C_6H_4Br_2)_{2.81}(H_2O)_{2.6}$	MFI	1992MEN
60674	Zeolite ZSM-5	$(N(C_3H_7)_4)(Si_{23.04}Al_{0.96}O_{48})$	MFI	1986CHA/LIN
61010	Zeolite ZSM-5	$Na_{.1}H_{3.9}Al_4Si_{92}O_{192}$	MFI	1985LIU/ZHA
62274	Zeolite ZSM-5	$Si_{12}O_{24}(NC_{12}H_{28}OH)_{0.5}$	MFI	1987VAN/VAN
66157	Zeolite ZSM-5	$Tl_{3.35}(Al_{3.43}Si_{92.57}O_{192})(H_2O)_{27.14}$	MFI	1991HUD/REE
66165	Zeolite ZSM-5	$Cs_{.4}(Al_{.9}Si_{23.1}O_{48})(H_2O)_{2.4}$	MFI	1991LIN/CHA
66166	Zeolite ZSM-5	$Cs_{.4}(Al_{.9}Si_{23.1}O_{48})$	MFI	1991LIN/CHA
68256	Zeolite ZSM-5	$Ni_2H_2(Al_6Si_{90}O_{192})$	MFI	1986ZHE/ZHA
79009	Silicalite	$(Si_{96}O_{192})(C_8H_{10})_4$	MFI	1995MEN/GEL
84039	Zeolite H-ZSM-5	$Si_{96}O_{192}$	MFI	1990VAN/JAN
84532	Pentasil	$H_{6.4}(B_{6.4}Si_{89.6}O_{192})$	MFI	1984PAN/LI
85119	Zeolite H-ZSM-5	$(Si_{12}O_{24})(C_6H_6N_2O_2)_{0.5}$	MFI	1997VAN/KOE
86279	Zeolite ZSM-5	$Si_{96}O_{192}$	MFI	1982YU/LI
88911	Zeolite ZSM-5	$((C_3H_7)_4N)_4(Al_4Si_{92}O_{192})$	MFI	1999YOK/IDA
90725	Zeolite ZSM-5	$Cs_{5.32}(Al_{5.8}Si_{90.2}O_{192})$	MFI	2000OLS/KHO
91678	Zeolite ZSM-5	$(Si_{96}O_{192})(C_6H_6N_2O_2)_4$	MFI	2000FYF/BRO
91694	Silicalite	$(Ti_{2.09}Si_{93.91})O_{192}$	MFI	2000MAR/ART
153029	Zeolite H-ZSM-5 (Sb-exchanged)	$(Sb_5O_5(H_2O)_{2.26})_{0.61}(SiO_2)_{96}$	MFI	2005LI/LI
203220	Zeolite H-ZSM-5	$(Si_{12}O_{24})(C_6H_4Cl_2)_{0.32}$	MFI	1996VAN/JAN
280364	Silicalite	$Si_{12}O_{24}$	MFI	2000ART/LAM
280365	Silicalite	$Si_{12}O_{24}$	MFI	2000ART/LAM
411155	Silicalite	$Na_{0.26}C_{3.6}N_{0.3}Si_{12}O_{24}$	MFI	2000MIL/LAM
4393	Mordenite	$Ca_{.07}Al_{.1629}Si_{.8375}O_2$	MOR	1975MOR/PLU
9632	Mordenite	$Ca_{3.4}Al_{7.4}Si_{40.6}O_{96}(H_2O)_{31}$	MOR	1976MOR/PLU
34891	Mordenite	$Na(AlSi_5O_{12})$	MOR	1961MEI
40533	Mordenite	$Ca_{3.6}(Al_{7.2}Si_{40.8}O_{96})$	MOR	1985ITO/SAI
40940	Mordenite	$(K_{2.8}Na_2Ca_2)(Al_{8.8}Si_{39.2}O_{96})(H_2O)_{34}$	MOR	1986ALB/DAV
62950	Mordenite	$Ca_{0.4}Al_{0.98}Si_{5.03}O_{12}(H_2O)_{3.57}$	MOR	1987ELS/KIN
62951	Mordenite	$Ca_{0.40}Al_{0.98}Si_{5.03}O_{12}(H_2O)_{1.895}$	MOR	1987ELS/KIN
62952	Mordenite	$Ca_{0.41}Al_{0.98}Si_{5.03}O_{12}(H_2O)_{0.465}$	MOR	1987ELS/KIN
62953	Mordenite	$Ca_{0.43}Al_{0.98}Si_{5.03}O_{12}(H_2O)_{0.21}$	MOR	1987ELS/KIN
68445	Mordenite	$Na_{7.79}(Al_{7.87}Si_{40.13}O_{96})(H_2O)_{10.16}$	MOR	1989SHI/ITO
68446	Mordenite	$Na_{5.81}(Al_{5.75}Si_{42.25}O_{96})(H_2O)_{5.92}$	MOR	1989SHI/ITO
68447	Mordenite	$Na_{4.60}(Al_{4.55}Si_{43.45}O_{96})(H_2O)_{8.36}$	MOR	1989SHI/ITO
68448	Mordenite	$Na_{0.31}(Al_{3.55}Si_{42.72}O_{96})(H_2O)_{2.76}$	MOR	1989SHI/ITO
97846	Zeolite MOR	$Na_{7.45}(Al_{7.76}Si_{40.24}O_{96})(H_2O)_{32}$	MOR	2003KAT/ITA
97847	Zeolite MOR	$Na_{5.33}(Al_{5.55}Si_{42.45}O_{96})(H_2O)_{32}$	MOR	2003KAT/ITA
97848	Zeolite MOR	$Na_{4.67}(Al_{4.8}Si_{43.2}O_{96})(H_2O)_{32}$	MOR	2003KAT/ITA
100198	Mordenite	$Ca_{0.32}Ba_{3.32}(Al_{8.6}Si_{39.9})O_{96}$	MOR	1978SCH/PLU
100226	Mordenite	$Na_{7.3}K_{0.2}(Al_{8.3}Si_{39.9}O_{96})$	MOR	1979SCH/PLU
100227	Mordenite	$Rb_{8.01}Al_{8.02}Si_{39.98}O_{96}$	MOR	1978SCH/PLU2
100519	Mordenite	$Cs_{5.50}Al_8Si_{40}O_{96}$	MOR	1978SCH/PLU3
100576	Mordenite	$Na_{.6}Al_{8.5}Si_{39.5}O_{96}H_{7.9}$	MOR	1979SCH/PLU2
100577	Mordenite	$Ca_{1.4}Al_{8.5}Si_{39.5}O_{96}H_{5.7}$	MOR	1979SCH/PLU3
172085	Mordenite	$(Na_{.775}K_{.035}Ca_{.472}Mg_{.022}Sr_{.002})(Fe_{0.007}Si_{10.133}Al_{1.85})O_{24}(H_2O)_{6.897}$	MOR	2003MAR/SAC

TABLE 8. List of 226 zeolite entries belonging to nine distinct framework types (ANA, EDI, FER, GIS, KFI, LAU, LTL, MFI, MOR) with population 19 ⩽n⩽33—Continued

ICSD code	Mineral name	Chemical formula	FTC	Reference
172086	Mordenite	$(Ca_{.439}Mg_{.008}Sr_{0.001})(Fe_{.007}Si_{10.133}Al_{1.85})O_{24}(H_2O)_{4.887}$	MOR	2003MAR/SAC
172087	Mordenite	$Fe_{.002}Si_{3.378}Al_{.617}O_8(H_2O)_{1.081}$	MOR	2003MAR/SAC
172088	Mordenite	$Na_{.547}(Fe_{.007}Si_{10.133}Al_{1.85})O_{24}(H_2O)_{1.568}$	MOR	2003MAR/SAC
172577	Zeolite MOR	$Na_7(Ga_7Si_{41}O_{96})$	MOR	2006HAN/CHI

TABLE 9. List of 134 zeolite entries belonging to 14 distinct framework types (ABW, BIK, BOG, BRE, ERI, GME, LEV, MAZ. MTN, PHI, RWY, STI, THO, YUG) with population 6⩽n⩽14

ICSD code	Mineral name	Chemical formula	FTC	Reference
6269	Zeolite ABW	$Li_{0.91}(Al_{0.91}Si_{1.09}O_4)(H_2O)_{0.98}$	ABW	1974KER
40128	Zeolite Li-A	$LiAlSiO_4(D_2O)$	ABW	1986NOR/NOR
40941	Zeolite	$Li(AlSiO_4)(H_2O)$	ABW	1986AND/PLO
60890	Zeolite Li-A	$LiAlSiO_4(D_2O)$	ABW	1986NOR/NOR
60892	Zeolite A	$Li(AlSiO_4)(D_2O)$	ABW	1986NOR/NOR
66153	Zeolite ABW	$Tl_{1.1}(AlSiO_4)$	ABW	1991KRO/KRO
68101	Zeolite Li-A	$Li_2(AlGaSi_2O_8)(H_2O)_2$	ABW	1988YAN/XIE
68257	Zeolite A	$Li(AlSiO_4)(H_2O)$	ABW	1986KRO/PLO
89954	Zeolite Li-A	$Li(AlSiO_4)(H_2O)$	ABW	2000NOR/HAN
91662	Zeolite ABW	$Li(AlGeO_4)(H_2O)$	ABW	2000TRI/KIM
93115	Zeolite ABW	$(NH_4)(ZnAsO_4)$	ABW	2001FEN/ZHA
97909	Zeolite Li-ABW	$Li(AlSiO_4)$	ABW	2003CER/FOI
97910	Zeolite Li-ABW	$Li(AlSiO_4)$	ABW	2003CER/FOI
6250	Bikitaite 1M	$Li(AlSi_2O_6)H_2O$	BIK	1974KOC/GAI
29551	Bikitaite 1A	$Li(AlSi_2O_6)(H_2O)$	BIK	1986BIS/LIE
30812	Bikitaite; caesian	$Cs_{0.35}(Al_{0.35}Si_{2.65}O_6)$	BIK	1984ANN/FAE
68586	Bikitaite 1A	$Li_{1.86}(Al_2Si_{3.89}O_{12})(H_2O)_2$	BIK	1989STA/KVI
68587	Bikitaite 1A	$Li_{1.86}Al_2(Si_{3.95}O_{12})(H_2O)_2$	BIK	1989STA/KVI
88917	Bikitaite 1A	$Li_2(Al_2Si_4O_{12})(H_2O)_2$	BIK	1999QUA/SAN
97700	Bikitaite	$Li_2(Al_2Si_4O_{12})(H_2O)_2$	BIK	2003COM/GAT
97701	Bikitaite	$Li_2(Al_2Si_4O_{12})(H_2O)_2$	BIK	2003COM/GAT
97702	Bikitaite	$Li_2(Al_2Si_4O_{12})(H_2O)_2$	BIK	2003COM/GAT
98842	Bikitaite	$Li_2(Al_2Si_4O_{12})(H_2O)_2$	BIK	2004FER/QUA
98843	Bikitaite	$Li_2(Al_2Si_4O_{12})(H_2O)_{1.43}$	BIK	2004FER/QUA
98844	Bikitaite	$Li_2(Al_2Si_4O_{12})(H_2O)_{0.77}$	BIK	2004FER/QUA
98845	Bikitaite	$Li_2(Al_2Si_4O_{12})$	BIK	2004FER/QUA
55231	Boggsite	$(Ca_{9.68}(H_2O)_{41.25})(Al_{19.36}Si_{76.64}O_{192})$	BOG	2004ZAN/CRU
55232	Boggsite	$(Ca_{5.36}(H_2O)_{10.48})(Al_{16.8}Si_{79.2}O_{192})$	BOG	2004ZAN/CRU
55233	Boggsite	$Ca_{7.77}(Al_{16.96}Si_{79.04}O_{192})$	BOG	2004ZAN/CRU
55234	Boggsite	$Ca_{7.69}(Al_{17.12}Si_{78.88}O_{192})$	BOG	2004ZAN/CRU
55235	Boggsite	$(Ca_{5.4}(H_2O)_{11.52})(Al_{17.12}Si_{78.88}O_{192})$	BOG	2004ZAN/CRU
55236	Boggsite	$(Ca_{9.84}(H_2O)_{31.19})(Al_{19.68}Si_{76.32}O_{192})$	BOG	2004ZAN/CRU
69120	Boggsite	$Si_{96}O_{192}(H_2O)_{137.04}$	BOG	1990PLU/SMI
1136	Brewsterite	$Ba_{0.5}K_{0.02}Sr_{1.48}Al_4Si_{12}O_{32}(H_2O)_{10}$	BRE	1977SCH/PLU
15885	Brewsterite	$Sr(Al_{1.98}Si_{6.02}O_{16})(H_2O)_{4.9}$	BRE	1964PER/SMI
41276	Brewsterite	$Ba_2(Al_4Si_{12}O_{32})(H_2O)_{9.76}$	BRE	1993CAB/LUC
48183	Brewsterite	$Sr_{.95}Ba_{.05}Al_2Si_6O_{16}(H_2O)_5$	BRE	1985ART/SMI
88923	Brewsterite	$(Sr_{0.67}Ba_{0.33})(Al_2Si_6O_{16})(H_2O)_{4.558}$	BRE	1999STA/HAN
88924	Brewsterite	$(Sr_{0.67}Ba_{0.33})(Al_2Si_6O_{16})(H_2O)_{2.84}$	BRE	1999STA/HAN
88925	Brewsterite	$(Sr_{0.67}Ba_{0.33})(Al_2Si_6O_{16})(H_2O)_{2.146}$	BRE	1999STA/HAN
88926	Brewsterite	$(Sr_{0.67}Ba_{0.33})(Al_2Si_6O_{16})(H_2O)_{1.036}$	BRE	1999STA/HAN
91695	Brewsterite	$(Ba_{0.51}Sr_{1.49})(Al_4Si_{12}O_{32})(H_2O)_{9.554}$	BRE	2000SAC/VEZ
91696	Brewsterite	$(Ba_{0.51}Sr_{1.49})(Al_4Si_{12}O_{32})(H_2O)_{8.73}$	BRE	2000SAC/VEZ
91697	Brewsterite	$(Ba_{0.51}Sr_{1.49})(Al_4Si_{12}O_{32})(H_2O)_{3.12}$	BRE	2000SAC/VEZ
91698	Brewsterite	$(Ba_{0.51}Sr_{1.49})(Al_4Si_{12}O_{32})(H_2O)_{2.13}$	BRE	2000SAC/VEZ

TABLE 9. List of 134 zeolite entries belonging to 14 distinct framework types (ABW, BIK, BOG, BRE, ERI, GME, LEV, MAZ. MTN, PHI, RWY, STI, THO, YUG) with population $6 \leqslant n \leqslant 14$—Continued

ICSD code	Mineral name	Chemical formula	FTC	Reference
23491	Erionite	$Ca_2Al_4Si_{32}O_{72}(H_2O)_4$	ERI	1969KAW/CUR
31143	Erionite	$Na_9(Al_9Si_{27}O_{72})(H_2O)_{27}$	ERI	1959STA/GAR
85447	Erionite	$K_{1.96}Ca_{3.56}(Al_{9.48}Si_{26.52}O_{72})(H_2O)_{30.78}$	ERI	1997ALB/MAR
85543	Erionite	$K_{1.74}Ca_{2.72}Mg_{0.80}(Al_{8.22}Si_{27.78}O_{72})(H_2O)_{31.56}$	ERI	1998GUA/ART
85544	Erionite	$K_2Ca_4(Al_{10.39}Si_{25.61}O_{72})(H_2O)_{29.70}$	ERI	1998GUA/ART
85545	Erionite	$K_2Ca_{2.44}Mg_{0.52}(Al_{7.908}Si_{28.092}O_{72})(H_2O)_{21.6}$	ERI	1998GUA/ART
85546	Erionite	$K_{1.70}Ca_{3.6}(Al_{10.164}Si_{25.836}O_{72})(H_2O)_{26.76}$	ERI	1998GUA/ART
20893	Gmelinite; potassian	$(K_{5.44}Na_{8.4})(Al_8Si_{16}O_{48})(H_2O)_{8.9}$	GME	1984MAL
31240	Gmelinite	$Na_2Al_2Si_4O_{12}(H_2O)_5$	GME	1982GAL/PAS
31241	Gmelinite	$CaAl_2Si_4O_{12}(H_2O)_{5.8}$	GME	1982GAL/PAS
33668	Gmelinite	$CaAl_2Si_4O_{12}(H_2O)_6$	GME	1966FIS
62315	Gmelinite	$Ba_{3.44}(Al_8Si_{16}O_{48})(H_2O)_{19.12}$	GME	1986VIG/MAL
69223	Gmelinite	$Ca_{1.67}Mg_{.12}Sr_{.39}Na_{.22}K_{1.94}(Al_8Si_{16}O_{48})(H_2O)_{18.94}$	GME	1990VEZ/QUA
78805	Gmelinite	$Ca_{3.56}Si_{16.75}Al_{7.3}O_{48}(H_2O)_{9.36}$	GME	1995SAC/PAS
78806	Gmelinite	$Na_{8.08}Si_{16.26}Al_{7.69}O_{48}(H_2O)_{14.4}$	GME	1995SAC/PAS
78807	Gmelinite	$K_{7.72}(Si_{16.6}Al_{7.4}O_{48})(H_2O)_{12.84}$	GME	1995SAC/PAS
4361	Levyne	$Ca_{2.76}Na_{0.68}K_{0.21}(Al_{6.48}Si_{11.52}O_{35.97})(H_2O)_{15.27}$	LEV	1975MER/GAL
78091	Zeolite Nu-3	$(Si_{54}O_{108})((C_{10}H_{15})(NH_2))_6$	LEV	1993MCC
78092	Zeolite Nu-3	$(Si_{54}O_{108})(C_8H_{16}N)_6$	LEV	1993MCC
83005	Levyne	$Ca_{4.74}Na_{2.88}K_{0.66}(Al_{18.77}Si_{35.23}O_{108})(H_2O)_{46.62}$	LEV	1996SAC
83006	Levyne	$Ca_{4.98}Na_{4.08}(Al_{18.8}Si_{35.2}O_{108})(H_2O)_{49.14}$	LEV	1996SAC
83007	Levyne	$Ca_{4.92}Na_6K_{0.42}(Al_{17.97}Si_{36.03})O_{108}(H_2O)_{42.3}$	LEV	1996SAC
109311	Levyne	$Ca(Al_2Si_4O_{12})(H_2O)_6$	LEV	1959BAR/KER
6258	Mazzite	$K_{2.76}Mg_2Ca_{0.84}(Si_{36}O_{72})(H_2O)_{32.38}$	MAZ	1974GAL
8287	Mazzite	$Na_{0.30}K_{2.52}Ca_{1.06}Mg_2(Al_{9.72}Si_{26.28}O_{71.61})(H_2O)_{31.87}$	MAZ	1975GAL
108998	Mazzite	$K_{1.476}Ca_{1.65}Mg_{1.9}(Al_{9.504}Si_{26.496}O_{72})(H_2O)_{8.76}$	MAZ	1975RIN/PLU
171093	Mazzite; Na	$Na_4((Si_{.77}Al_{.23})_{18}O_{36})(H_2O)_{15}$	MAZ	2005ARL/GAL
172575	Zeolite MAZ	$Na_{7.26}(Ga_{8.9}Si_{27.1}O_{72})$	MAZ	2006HAN/CHI
201820	Mazzite	$Na_{3.5}Si_{13.5}Ga_{3.9}O_{36}H_{2.64}$	MAZ	1985NEW/JAR
48154	Dodecasil 3C	SiO_2	MTN	1984GIE
56320	Dodecasil 3C	SiO_2	MTN	1992KOE/MIE
56321	Dodecasil 3C	SiO_2	MTN	1992KOE/MIE
68593	Zeolite ZSM-39	$(Si_{136}O_{272})(CH_3NH_2)_8$	MTN	1987LON/HE
71439	Zeolite ZSM-39	$(SiO_2)_{17}(((CH_3)_4N)F)$	MTN	1991ZHA/PAN
77449	Dodecasil 3C	SiO_2	MTN	1992KOE/MIE
77450	Dodecasil 3C	SiO_2	MTN	1992KOE/MIE
77925	Dodecasil 3C	$(SiO_2)_{17}(C_4H_8O)$	MTN	1997KNO/DEP
201182	Zeolite ZSM-39	SiO_2	MTN	1981SCH/DWY
2317	Phillipsite	$Ca_{1.64}K_2Si_{10.67}Al_{5.33}O_{32}(H_2O)_{12}$	PHI	1974RIN/PLU
2318	Harmotome	$Ca_{0.6}Ba_2(Al_4Si_{12}O_{32})(OH)(H_2O)_{11}$	PHI	1974RIN/PLU
15460	Harmotome	$Ba_2Al_4Si_{12}O_{32}(H_2O)_{12}$	PHI	1961SAD/MAR
23902	Phillipsite	$Na_4KAl_5Si_{11}O_{32}(H_2O)_{10}$	PHI	1962STE
51638	Phillipsite	$Mg_{1.56}Na_{1.24}K_{1.06}(Al_{5.3}Si_{10.7}O_{32})(H_2O)_{9.6}$	PHI	2001GUA
51639	Phillipsite	$Mg_{1.52}Na_{0.88}K_{0.22}(Al_{4.5}Si_{11.5}O_{32})(H_2O)_{10.96}$	PHI	2001GUA
69418	Harmotome	$Ba_2(Al_{4.16}Si_{11.84}O_{32})(H_2O)_{12}$	PHI	1990STU/FUE
69419	Harmotome	$Ba_2(AlSi_3O_8)_4(H_2O)_{12}$	PHI	1990STU/FUE
69420	Harmotome	$Ba_{1.96}(Al_{4.85}Si_{10.27}O_{32})(H_2O)_{11.54}$	PHI	1990STU/FUE
90139	Phillipsite	$(Na_{0.205}Ca_{0.39}K_{0.61})(Al_{1.6}Si_{2.4})O_8(H_2O)_{2.565}$	PHI	2000GUA2
95303	Phillipsite	$(Ca_{0.52}Na_{0.54})K_{0.15}Li_4(Al_{5.92}Si_{10.08}O_{32})(H_2O)_{13.31}$	PHI	2001GUA2
280421	Phillipsite	$Na_{0.104}(NH_4)_{0.952}(Si_{3.2}O_{8.256})$	PHI	2000GUA
280422	Phillipsite	$Na_{0.1}(NH_4)_{1.01}(Si_4O_8)(H_2O)_{2.37}$	PHI	2000GUA
280423	Phillipsite	$Na_{0.13}(NH_4)_{1.13}(Si_{5.33}O_{10.66})(H_2O)_{3.46}$	PHI	2000GUA
281735	UCR-20GeGaS-AEM sulfide zeolite	$(Ga_2Ge_2S_8)(C_6H_{14}N_2O)_2$	RWY	2002ZHE/BU

TABLE 9. List of 134 zeolite entries belonging to 14 distinct framework types (ABW, BIK, BOG, BRE, ERI, GME, LEV, MAZ. MTN, PHI, RWY, STI, THO, YUG) with population $6 \leqslant n \leqslant 14$—Continued

ICSD code	Mineral name	Chemical formula	FTC	Reference
281746	UCR-20GaGeS-AEP sulfide zeolite	$(Ga_2Ge_2S_8)(C_9H_{20}N_2)_{0.333}$	RWY	2002ZHE/BU
281750	UCR-20GaGeS-BAPP sulfide zeolite	$(Ga_2Ge_2S_8)(C_6H_{14}N_2O)_{0.98}$	RWY	2002ZHE/BU
281751	UCR-20GaGeS-TAEA sulfide zeolite	$(Ga_{2.67}Ge_{1.33}S_8)(C_6H_{18}N_4)_{0.428}$	RWY	2002ZHE/BU
281752	UCR-20GaGeS-TMDP sulfide zeolite	$(Ga_{1.8}Sn_{2.2}S_8)(C_{13}H_{26}N_2)$	RWY	2002ZHE/BU
281753	UCR-20InGeS-TMDP sulfide zeolite	$(In_3GeS_8)(C_{13}H_{26}N_2)$	RWY	2002ZHE/BU
281754	UCR-20InSnS-TMDP sulfide zeolite	$(In_{2.5}Ge_{1.5}S_8)(C_{13}H_{26}N_2)$	RWY	2002ZHE/BU
281757	UCR-20GaGeSe-TEPA selenide zeolite	Ga_4Se_8	RWY	2002ZHE/BU
281758	UCR-20GaGeSe-TMDP selenide zeolite	$(Ga_4Se_8)(C_{13}H_{26}N_2)$	RWY	2002ZHE/BU
281759	UCR-20GaSnSe-TMDP selenide zeolite	$(Ga_{2.31}Sn_{1.69}Se_8)(C_{13}H_{26}N_2)$	RWY	2002ZHE/BU
4395	Stellerite	$Ca_{7.323}Si_{72}O_{151.323}(H_2O)_{48.197}$	STI	1975GAL/ALB
4396	Barrerite	$Na_{13.56}(Al_{13.54}Si_{58.46}O_{144})(H_2O)_{58.56}$	STI	1975GAL/ALB2
9094	Stilbite	$Na_{1.76}Ca_{4.00}(Al_{10.29}Si_{25.71}O_{72})(H_2O)_{29.4}$	STI	1971GAL
26357	Stilbite	$Na_3Ca_{3.36}Al_{9.48}Si_{26.52}O_{72}(H_2O)_{24.48}$	STI	1970SLA
28270	Stilbite	$Na_2Ca_4(Al_{10}Si_{26}O_{72})(H_2O)_{32}$	STI	1966GAL/GOT
31043	Stilbite	$Ca_{2.62}H_{4.56}(Al_{9.8}Si_{26.2}O_{72})$	STI	1980PEA/MOR
47222	Stellerite	$Ca_{7.7}Na_{.3}Al_{16.6}Si_{55.4}O_{144}(H_2O)_{50}$	STI	1985MIL/TAY
66687	Stilbite	$Na_{0.72}Ca_4(Al_{10}Si_{26}O_{72})(H_2O)_{29.12}$	STI	1993AKI/KUD
83469	Stilbite	$Na_{7.67}Ca_{4.84}(Al_{17.35}Si_{54.65}O_{144})(H_2O)_{16.56}$	STI	1997CRU/ART
85454	Stellerite	$Ca_4(Al_{8.32}Si_{27.68})O_{72}(H_2O)_{35.36}$	STI	1986PEC/MAT
88912	Barrerite	$Na_{9.9}K_{3.46}Ca_{3.52}Al_{15.9}Si_{56.1}O_{144}(H_2O)_{44.68}$	STI	1999SAC/SAN
88913	Stilbite	$Na_{7.98}K_{3.18}Ca_{3.88}Al_{16.64}Si_{55.36}O_{144}(H_2O)_{45.28}$	STI	1999SAC/SAN
90027	Barrerite	$Na_{0.41}Ca_{0.63}(ND_4)_{12.8}(Al_{13.68}Si_{58.32}O_{144})(D_2O)_{36.16}$	STI	2000MEN/ALB
201379	Stellerite	$Na_{7.52}Si_{28.44}Al_{7.56}O_{72}(H_2O)_{19.68}$	STI	1982PAS/SAC
20007	Thomsonite	$NaCa_2(Al_5Si_5O_{20})(H_2O)_6$	THO	1978AMI/AMI
41195	Thomsonite	$Na_{1.26}Ca_{1.74}(Si_{5.26}Al_{4.74}O_{20})(H_2O)_6$	THO	1982PEC
61166	Thomsonite	$NaCa_2(Al_5Si_5O_{20})(H_2O)_6$	THO	1985PLU/SMI
68500	Thomsonite	$Na_{1.00}(Ca_{1.88}Sr_{0.12})Al_5(Si_5O_{20})(H_2O)_6$	THO	1990STA/KVI
91665	Zeolite THO	$Rb_{20}(Ga_{20}Ge_{20}O_{80})(H_2O)_{14.86}$	THO	2000LEE/KIM5
92906	Thomsonite	$(Na_{1.2}Ca_{0.8})(Sr_{0.52}Ca_{0.48})(Si_{5.2}Al_{4.8}O_{20})(H_2O)_6$	THO	2001GUR/RAS
201449	Thomsonite	$Na_{1.08}Ca_{1.84}Sr_{.08}(Al_5Si_5O_{20})(H_2O)_6$	THO	1981ALB/VEZ2
26151	Yugawaralite	$Ca_2Al_4Si_{12}O_{32}(H_2O)_8$	YUG	1969KER/WIL
26801	Yugawaralite	$CaAl_2Si_6O_{16}(H_2O)_4$	YUG	1969LEI/SLA
26819	Yugawaralite	$CaAl_2Si_6O_{16}$	YUG	1967KER/WIL
29505	Yugawaralite	$CaAl_2Si_6O_{16}O_{4.038}H_{7.91}$	YUG	1986KVI/ART
96711	Yugawaralite	$Ca(Al_2Si_6O_{16})(H_2O)_4$	YUG	2002TAN/KIM
96712	Yugawaralite	$Ca(Al_2Si_6O_{16})(H_2O)_4$	YUG	2002TAN/KIM

TABLE 10. List of 52 zeolite entries belonging to twelve distinct framework types with population $3 \leqslant n \leqslant 5$

ICSD code	Mineral name	Chemical formula	FTC	Reference
69667	Zeolite SSZ-24	$SiO_{2.267}$	AFI	1991BIA/MEI
91671	Zeolite AlPO-5	$Al(PO_4)$	AFI	2000KLA/VAN
91672	Zeolite AlPO-5	$Al(PO_4)$	AFI	2000KLA/VAN
91673	Zeolite AlPO-5	$Al(PO_4)$	AFI	2000KLA/VAN
91674	Zeolite AlPO-5	$Al(PO_4)$	AFI	2000KLA/VAN
48153	Dodecasil 1H	SiO_2	DOH	1984GER/GIE
54115	Dodecasil 1H	$(SiO_2)_{34}N_5(C_{10}H_{15}(NH_2))$	DOH	1986GIE
57106	Dodecasil-1H	$(SiO_2)_{34}(C_{10}H_{15}NH_2)(NH_3)_5$	DOH	1993MIE/VOG
26537	Zeolite TMA	$Na_{9.52}((CH_3)_4N)_{2.38}(Al_{9.4}Si_{26.6}O_{72})(OH)_{1.3}(H_2O)_{25}$	EAB	1981MEI/GRO
31491	Zeolite TMA	$Na_{9.4}(Al_{9.4}Si_{26.6}O_{72})(H_2O)_{37.56}$	EAB	1981MEI/GRO
31492	Zeolite TMA	$Na_{9.4}Al_{9.4}Si_{26.6}O_{72}(H_2O)_{36.8}$	EAB	1981MEI/GRO
64728	Bellbergite	$K_2Sr_2Ca_6(Al_{18}Si_{18})O_{72}(H_2O)_{30}$	EAB	1993RUE/TIL
201596	Zeolite E	$K_{9.08}Al_{10.8}Si_{25.2}O_{72}$	EAB	1984CAR/KEL
83358	Zeolite ECR-1	$(NH_4)_{11.25}(Al_{11.25}Si_{48.75}O_{120})$	EON	1996CHE/SCH
152236	Zeolite TNU-7	$Na_{12.4}(Ga_{12.4}Si_{47.6}O_{120})$	EON	2005WAR/WRI
171705	Zeolite ECR-1	$Na_{0.93}Si_5O_{10}(H_2O)_{3.13}$	EON	2006GUA/FER
171706	Zeolite ECR-1	$(NH_4)_{2.5}O_{36.69}Si_{15}$	EON	2006GUA/FER
18124	Epistilbite	$Ca_{2.96}Al_{6.4}Si_{17.6}O_{48}(H_2O)_{15}$	EPI	1969SLA/KAN
172072	Estilbite	$Ca_{.36}(Al_{.726}Si_{2.274})O_6(H_2O)_{1.945}$	EPI	2003CRU/MAR
172073	Estilbite	$Ca_{.375}(Al_{.726}Si_{2.274})O_6(H_2O)_{1.72}$	EPI	2003CRU/MAR
172074	Estilbite	$Ca_{.35}(Al_{.726}Si_{2.274})O_6(H_2O)_{1.205}$	EPI	2003CRU/MAR
84259	Zeolite SSZ-42	$Si_{32}O_{64}$	IFR	1997CHE/FIN
85580	Zeolite SSZ-42; calcined	$Si_{32}O_{64}$	IFR	1998CHE/FIN
280740	Zeolite IFR	SiO_2	IFR	2001VIL/LIG
280741	Zeolite IFR	SiO_2	IFR	2001VIL/LIG
280742	Zeolite IFR	SiO_2	IFR	2001VIL/LIG
30003	Zeolite ZSM-11	$Na_8(Al_8Si_{88}O_{192})(H_2O)_{16}$	MEL	1978KOK/CHU
40136	Zeolite ZSM-11	SiO_2	MEL	1989FYF/GIE
40517	Zeolite ZSM-11	$Si_{96}O_{192}$	MEL	1989FYF/GIE
65354	Zeolite ZSM-11	SiO_2	MEL	1988TOB/EDD
83331	Zeolite ZSM-11	SiO_2	MEL	1996HOC/MAR
81895	Zeolite W	$K_{10.32}(Si_{21.7}Al_{10.3}O_{64})(H_2O)_{24.32}$	MER	1996BIE/BOR
86741	Merlinoite	$(C_8H_{20}N)_{0.8}H_{0.37}K_{5.53}(Al_{6.7}Si_{25.3}O_{64})(H_2O)_{15.62}$	MER	1998BAR/VAL
93957	Merlinoite	$K_{11.5}(Al_{11.5}Si_{20.5}O_{64})(H_2O)_{15.52}$	MER	2001SKO/ELL
93958	Merlinoite	$K_{11.5}(Al_{11.5}Si_{20.5}O_{64})$	MER	2001SKO/ELL
100419	Merlinoite	$Na_{0.68}K_{4.48}Ca_{1.92}Ba_{0.32}(Al_{9.28}Si_{22.72}O_{64})(H_2O)_{19.44}$	MER	1979GAL/GOT
40137	Zeolite ZSM-12	SiO_2	MTW	1990FYF/GIE
62582	Zeolite ZSM-12	SiO_2	MTW	1985LAP/ROH
95487	Zeolite ZSM-12	$(SiO_2)_{14}(C_6H_4(NO_2)(NH_2))_{0.745}$	MTW	2002KIN/DAN
2747	Offretite	$KCa_{0.92}Mg_{0.82}(Si_{13.52}Al_{4.48}O_{36})(H_2O)_{9.84}$	OFF	1972GAR/TAI
83357	Offretite	$KCa_{1.32}MgAl_{5.7}Si_{12.3}O_{36}(H_2O)_{15.53}$	OFF	1996ALB/CRU
85547	Offretite	$K_{0.96}Ca_{1.52}Mg_{0.97}(Al_{5.40}Si_{12.60}O_{36})(H_2O)_{15.50}$	OFF	1998GUA/ART
85548	Offretite	$K_{0.89}Ca_{1.50}Mg_{0.86}(Al_{5.48}Si_{12.52}O_{36})(H_2O)_{16.07}$	OFF	1998GUA/ART
85549	Offretite	$KCa_{1.4}Mg(Al_{5.238}Si_{12.762}O_{36})(H_2O)_{13.52}$	OFF	1998GUA/ART
86547	RUB-3	SiO_2	RTE	1995MAR/GRU
87565	Zeolite RUB-3	$(C_7H_{13}N)_{2.514}Si_{24}O_{48}$	RTE	1998MAR/GRU
87566	Zeolite RUB-3	$Si_{24}O_{48}$	RTE	1998MAR/GRU
61178	Zeolite Theta-1	SiO_2	TON	1985HIG/SMI
62581	Zeolite ZSM-22	SiO_2	TON	1985KOK/SCH
65498	Zeolite ZSM-22	SiO_2	TON	1987MAR
69114	Zeolite Theta-1	SiO_2	TON	1990PAP/AND
201689	Zeolite Theta-1	SiO_2	TON	1984BAR/SMI

TABLE 11. List of 65 zeolite entries belonging to 53 distinct framework types with population $1 \leqslant n \leqslant 2$

ICSD code	Mineral name	Chemical formula	FTC	Reference
91679	Zeolite AlPO-53	$Al(PO_4)$	AEN	2000KIR/GRO
66844	Zeolite SSZ16	$Na_{3.06}H_{4.14}(Al_{7.2}Si_{40.8}O_{96})$	AFX	1996LOB/ZON
57128	Octadecasil	$(SiO_2)_{20}(C_7H_{13}N)_{0.9}(HF)_{0.9}$	AST	1991COL/GUT
98516	Zeolite AST	$(Ge_{10}O_{20}F)(N(CH_3)_2(C_2H_5)_2)$	AST	2003WAN/SON
74568	SAPO-31	$H_{1.1}(Al_{8.86}P_{8.33}Si_{0.67}O_{36})((C_3H_7)NH(C_3H_7))_{1.23}$	ATO	1994BAU/JOS
171499	Zeolite SSZ-55	$Si_{24}O_{48}F_{1.28}$	ATS	2006BUR/DAR
77717	Zeolite $GaPO_4$-21	$((H_3C)_2NH_2)(Ga_3P_3O_{12}(OH))$	AWO	1994LOI/RIO
97106	Tschernichite	$Ca_{4.84}Mg_{0.64}(Al_{10.96}Si_{53.04}O_{128})(H_2O)_{33.36}$	BEA	2002ALB/CRU
153253	Zeolite beta	$Si_{64}O_{128}$	BEA	2005MAR/PER
93108	Zeolite ITQ-14 beta	$(SiO_2)_{32}$	BEC	2001LIU/OHS
66152	Zeolite Q	$(NH_4)_2(Al_2Si_2O_8)(H_2O)_{2.86}$	BPH	1991AND/BOS
66156	Zeolite CAN	$Li_{4.56}Cs_{1.5}(Al_6Si_6O_{24})(H_2O)_{5.58}$	CAN	1991NOR/KRO
95484	Zeolite CAS	$Cs_4(Al_4Si_{20}O_{48})$	CAS	2002HUG/WEL
55948	Zeolite MCM-65	SiO_2	CDO	2004DOR/KEN
84260	Zeolite CIT-5	$Si_{32}O_{64}$	CFI	1997WAG/YOS
28316	Dachiardite	$Na_{1.1}K_{0.7}Ca_{1.7}(Al_{5.2}Si_{18.8}O_{48})(H_2O)_{12.7}$	DAC	1963GOT/MEI
35078	Dachiardite	$K_5Al_5Si_{19}O_{48}(H_2O)_{12}$	DAC	1963GOT/MEI
40939	Deca-dodecasil 3R	$(SiO_2)_{120}(C_{10}NH_{17})_6(N_2)_9$	DDR	1986GIE2
83860	Zeolite UTD-1	$Si_{64}O_{128}$	DON	1997LOB/TSA2
92901	Zeolite EMT	$Na_{20}(Al_{20}Si_{76}O_{192})$	EMT	2001YON/BUS
92903	Zeolite EMT	$Na_{20}(Al_{20}Si_{76}O_{192})$	EMT	2001YON/BUS
97735	Zeolite ECR-34	$K_{11.52}((Ga_{11.52}Si_{36.48})O_{96})$	ETR	2003STR/VAU
65551	Zeolite EU-1	SiO_2	EUO	1988BRI/JOH
99715	Zeolite EU-1	$H_{5.33}(Al_{5.33}Si_{106.67}O_{224})$	EUO	2004PER/JON
202114	Goosecreekite	$Ca(Al_2Si_6O_{16})(H_2O)_5$	GOO	1986ROU/PEA
281537	Zeolite ITQ-13	$(SiO_2)_{56}(((CH_3)_3N(CH_2)_6N(CH_3)_3)F_2)_2(H_2O)_4$	ITH	2003COR/PUC
91667	Zeolite JBW	$Na_2K(Al_3Si_3O_{12})(D_2O)_{0.59}$	JBW	2000HEA/JOH
91668	Zeolite JBW	$Na_2Rb(Al_3Ge_3O_{12})(H_2O)$	JBW	2000HEA/HEN
69408	Lovdarite	$K_4Na_{12}(Be_8Si_{28}O_{72})(H_2O)_{18}$	LOV	1990MER
31289	Zeolite N	$Na(AlSiO_4)(H_2O)_{1.35}$	LTN	1982FAE/AND
30791	Melanophlogite high	$(SiO_2)_{46}(CO_2)_{1.32}(N_2)_{4.68}(CH_4)_2$	MEP	1983GIE
84040	Zeolite ZSM-57	$H_{1.5}(Al_{1.5}Si_{34.5}O_{72})$	MFS	1990SCH/HIG
40111	Montesommaite	$K_{4.5}(Al_{4.5}Si_{11.5}O_{32})(H_2O)_4$	MON	1990ROS/RUB
95481	Montesommaite	$K_{6.18}(Al_{6.18}Ge_{9.82}O_{32})(H_2O)_4$	MON	2002TRI/PAR
83354	Zeolite ZSM-10	$K_{24}(Al_{24}Si_{84}O_{216})$	MOZ	1996HIG/SCH
152448	Zeolite ZSM-10	SiO_2	MOZ	2005FOS/TRE
73507	Zeolite ZSM-23	$(SiO_2)_{24}((NH_4)F)_{1.72}$	MTT	1993MAR/DER
86206	Zeolite ITQ-1	$Si_{72}O_{144}$	MWW	1998CAM/COR
81390	Gottardiite	$(Na_{2.5}K_{0.2}Mg_{3.1}Ca_{4.9})(Al_{20.4}Si_{115.6}O_{272})(H_2O)_{93}$	NES	1996ALB/VEZ
57132	Nonasil	$(SiO_2)_{88}(C_5H_{13}N)_4$	NON	1986MAR/DEH
413853	Nu-6(2)	SiO_2	NSI	2004ZAN/ALB
280761	Zeolite UiO-28	$Mg(HC_4N_3H_{13})(Al_3P_4O_{16})(H_2O)$	OWE	2001KON/FJE
280762	Zeolite UiO-28	$Mg(HC_4N_3H_{13})(Al_3P_4O_{16})$	OWE	2001KON/FJE
34452	Paulingite	$K_6Ca_{16}Al_{38}Si_{130}O_{336}(H_2O)_{113}$	PAU	1966GOR/SAM
56301	Paulingite	$K_{2.25}Na_{.31}Ca_{2.25}Ba_{1.44}(Al_{11.5}Si_{30.5}O_{84}H_{1.4})(H_2O)_{24.8}$	PAU	1997LEN/GIE
152295	Zeolite RUB-41	SiO_2	RRO	2005WAN/GIE
83674	Zeolite RUB-17	$K_4Na_{12}(Zn_8Si_{28}O_{72})(H_2O)_{18}$	RSN	1995ROE/GIE
56775	RUB-10	$(N(CH_3)_4)_4(Si_{32}B_4O_{72})$	RUT	1995GIE/RIU
93956	Zeolite RUB-10	$(Si_{36}O_{72})(C_4H_9N)_4$	RUT	2001MAR/WER
153257	Zeolite RUB-24	$Si_{32}O_{64}$	RWR	2005MAR/STR
410596	Zeolite SSZ-44	SiO_2	SFF	1999WAG/ZON
96967	Zeolite SSZ-58	SiO_2	SFG	2003BUR/ELO2
55346	Zeolite SSZ-53	$Si_{64}O_{128}$	SFH	2003BUR/ELO
55347	Zeolite SSZ-59	$Si_{16}O_{32}$	SFN	2003BUR/ELO
57126	Clathrasil sigma-2	$(SiO_2)_{64}(C_8H_{15}N)_4$	SGT	2001GRU/MAR

TABLE 11. List of 65 zeolite entries belonging to 53 distinct framework types with population $1 \leqslant n \leqslant 2$—Continued

ICSD code	Mineral name	Chemical formula	FTC	Reference
67465	Zeolite Sigma-2	$(SiO_2)_{64}(C_{10}H_{17}N)_{5.6}$	SGT	1988MCC
201587	Zeolite ZK-14	$Na_{3.68}(Al_{3.6}Si_{8.4}O_{24})(H_2O)_{1.2}$	SOD	1984CAR/MEI
410595	Zeolite SSZ-35	SiO_2	STF	1999WAG/ZON
73752	Zeolite SUZ-4	$K_5(Al_5Si_{31}O_{72})$	SZR	1993LAW/BEN
83466	Terranovaite	$Ca_{3.89}Na_{4.43}(Al_{12.30}Si_{67.70}O_{160})(H_2O)_{46.48}$	TER	1997GAL/QUA
85550	Tschoertnerite	$Ca_4(Sr_{1.03}K_{0.65}Ba_{1.32})Cu_3(Si_{12}Al_{12}O_{48})(OH)_8(H_2O)_{20.465}Cl_{0.056}$	TSC	1998EFF/GIE
151481	Zeolite IM-10	$((N(CH_3)_3)_2C_6H_{12})_2(F_4Ge_{40}O_{80})$	UOZ	2004MAT/PAI
83355	Zeolite VPI-5	$Al_3P_3O_{12}(H_2O)_5$	VFI	1996CHE/HAR
79160	Gaultite	$Na_4(Zn_2Si_7O_{18})(H_2O)_5$	VSV	1994ERC/VAN
56479	Zeolite DAB-2	$(Ga_4P_4O_{16})(HF)(N(C_2H_4)_3N)$	ZON	1997MED/GRO

4. Conclusions

In summary, we have analyzed the structure of 1473 entries in the ICSD and assigned the zeolite framework type for 1433 of them by calculating the CSs and VSs and using our machine learning model. We have determined that there is a group of 103 disordered crystalline structures in the ICSD for which we expect a zeolite framework-type classification based on the crystallographic information in the ICSD and the original publications. Based on our recent machine learning model and the conventional structural analysis approaches, we were able to confirm the assignment as zeolites and their FTC to 63 of these crystalline structures with framework disorder. Use of the framework-type information reported in Tables 2–11 has enabled our research group to develop a battery of machine learning models [2008YAN/LAC, 2009YAN/LAC2, 2009YAN/LAC3, 2009CAR/LAC, 2009YAN/LAC4] and will serve as reference and standards for future works in the chemistry, materials science, and applied mathematics communities. FTCs included in databases will be helpful for separating zeolites from other microporous zeolitic materials in those databases, and will be beneficial to the zeolite community for synthesis guide and for experimental calibration.

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