

Crystal structure of hexagonal trinepheline—A new synthetic NaAlSiO₄ modification

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ABSTRACT

The crystal structure of a synthetic NaAlSiO₄ modification has been solved and refined to an *R* index of 0.020 for 2745 independent reflections. The compound is hexagonal with space group symmetry *P*6₁, *a* = 9.995(2) Å and *c* = 24.797(4) Å. The crystal showed twinning by merohedry according to *m*₂₁₀, which was accounted for in the calculations. The phase was named trinepheline, following prior studies, because the length of its *c* lattice parameter is three times the length of the *c* parameter in nepheline, whereas the *a* parameter is about 10 Å in both phases. The crystal structure is characterized by layers of six-membered tetrahedral rings of exclusively oval conformation. The rings are built up by regularly alternating AlO₄ and SiO₄ tetrahedra. The stacking of the layers parallel to the *c* axis results in a three-dimensional network containing channels that are occupied by the Na cations. Although structural similarities with respect to tridymite derivatives can be found, hexagonal trinepheline represents a new type of stuffed tridymite that is not a simple superstructure of nepheline.