

Al Distribution in Zeolite ECR-1: A Powder X-ray Diffraction Study

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ECR-1 (Framework type EON), a large-pore aluminosilicate zeolite which was first synthesized by Vaughan and Strohmaier using bis(2-hydroxyethyl)dimethylammonium and Na⁺ ions as structure-directing agents (SDAs), has been proposed to consist of strictly alternating layers of the well-known mazzite (MAZ) and mordenite (MOR) structures. However, not until the crystal structure of TNU-7, one of synthetic gallosilicate zeolites discovered by us under wholly inorganic conditions, was reported did its structure refinement become successful. On the basis of the Rietveld refinements of synchrotron X-ray diffraction data for various cation forms of TNU-7, on the other hand, we have shown the existence of structural chemical zoning within its structure, i.e., the alteration of Ga-rich maz and Ga-poor mor layers. Here, we present the refined positions and occupancies of extraframework Na⁺, Sr²⁺, and La³⁺ ions in ECR-1, a large-pore aluminosilicate zeolite composed of strictly alternating layers of the well-known mazzite and mordenite structures. The overall Rietveld refinement results of this study lead us to propose the presence of structural chemical zoning within the ECR-1 structure, i.e., the alternation of Al-rich maz and Al-poor mor layers.