Synthesis of a New MEI-Type Zeolite in the Tetraethylammonium-Tetramethylammonium-Strontium-Lithium Mixed-SDA System

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The synthesis of ZSM-18 (framework type MEI) using highly sophisticated triquaternary molecules has long been considered as the unique example of a true templating in zeolite synthesis. This is because both the ZSM-18 cage and the occluded triquaternary organic species have the same three fold rotational symmetry and furthermore the absence of free rotation of organic molecules in the cage can distinguish this case from the structure-directing. Here, we report the synthesis of a new MEI-type zeolite, denoted PST-12 (POSTECH no. 12) using the two most studied simple organic molecules, tetraethylammonium and tetramethylammonium, together with Sr^{2+} and Li^{+}. Although the comprehensive cooperation of all four different types of molecules is responsible for the formation of this peculiar zeolite structure, it primarily contained tetramethylammonium in the pores. We have also estimated the formation pathway of this large pore zeolite that the very small crystals with BPH like structure were initially formed. From the overall results of this study, it is clear that the templating role of organic molecules in zeolite synthesis should be completely excluded.