MS14-P8 Seed-mediated synthesis of nanosized crystals of Beta zeolite

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The high industrial interest to zeolite Beta originates from the broad Si/Al range in zeolite Beta (5 – ∞) and its particular structure, being an intergrowth of different polymorphs and therefore being disordered in one dimension. The combination of three-dimensional pore architecture composed of intersecting 12-ring channels with strong acid sites makes this zeolite useful catalyst in a number of processes - such as catalytic cracking, hydroisomerisation, alkylation of aromatics, and esterification reactions, *etc*. In order to obtain nanosized crystals of zeolite Beta hydrothermal seed-induced synthesis is performed. Nanosized zeolites are important in catalytic and adsorptive applications. Smaller crystals of zeolites have larger surface areas and less diffusion limitations compared to zeolites with micrometer-sized crystals. During the synthesis two types of seeds are used - crystal seeds and mother liquor. Seed-induced synthesis by using of mother liquor as seeds leads to high yield of zeolite crystals. Crystal growth kinetics of the material as a function of seed content, type of seeds and Si/Al ratio of the initial gel are studied. After the optimization of crystallization conditions a highly crystalline material with crystal size 100–200 nm is synthesized. The obtained crystals were characterized by X-ray diffraction, scanning electron microscope, thermogravimetric analysis, and infrared spectroscopy.

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Keywords: Nanozeolites, Zeolite Beta, Seed-assisted synthesis

MS14-P9 $RbMnPO_4$ Zeolite-ABW-Type Material: a new multiferroic mineral related material

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The relation between crystal structure and properties of minerals and mineral-related materials is the key for technological benefit. A revival of the investigation of minerals related materials by the physicists and chemists took place in the recent years due to raising interest in multiferroic and magnetoelectric materials. Magnetoelectric materials are particularly of interest as one can control their magnetic properties by the application of an electric field and vice-versa. On the other hand, minerals have been a large source of materials for magnetoelectric compounds. Families like triphylite ($LiMPO_4$, M = Co, Fe, Ni) [1], boracites ($M_3B_7O_{13}X$, M = transition metal ion, Mg, Cd; X = halogen, OH, F or NO_3) [2] or pyroxenes AMX_2O_6 (A = Li, Na, Ca; M = transition metal ion; X = Si, Ge) have been widely investigated due to their magnetoelectric and multiferroic properties [3]. Here, we report on the magnetic and dielectric properties of a zeolite-ABW-type material, namely $RbMnPO_4$ [4,5]. This material exhibits a complex and rich phase diagram as function of temperature as illustrated in Figure 1. This system exhibits 5 different phases as function of temperature (T_1 = 4.7 K, T_2 = 5.1 K, T_3 = 175°C, T_4 = 260°C) with complex interplay between physical and crystallographic properties.

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