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# Optimization of EMT-type Zeolite Synthesis

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## Abstract

The optimization of the crystallization process of EMT-type zeolite from organic-template-free homogeneous suspensions will be presented. The formation of uniform suspensions utilizing sodium aluminate, sodium silicate and sodium hydroxide under controlled mixing is found to be of primary importance to control the nucleation and growth process of EMT type crystals. The zeolite intermediates have been investigated and the results reveal the formation of uniform in size gel particles. The mean hydrodynamic diameter of the ultimate EMT crystallites corresponds to the size of the amorphous particles formed after preparation of the clear precursor suspension.

The emphasis of this work is on the formation of EMT zeolites with diverse chemical compositions and particle sizes. Changes in the initial precursors and in the utilization of nucleation suppressing agents lead to the formation of EMT with bigger particle size. Together with the increase of zeolite crystals size undesired crystalline phases (SOD, GIS) appeared. Thus, it is of critical importance to control the nucleation kinetics in order to obtain the desire EMT type material as pure crystalline phase.

The careful control of gel chemistry combined with slow nucleation kinetics at low temperature provides access to nanoscale zeolites while avoiding the use of expensive organic templates. The role of each parameter influencing the nucleation process and the physico-chemical properties of ultimate zeolite material will be discussed.

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