

Synthesis of Zeolites for Adsorption and Catalytic Applications

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Zeolites are the most important group of inorganic materials applied in chemical industry mainly as adsorbents and catalysts. Their important properties stem from the presence of micropores having shape-selective properties for reactants, products and transition states and from the possibility to tailor the chemical composition of zeolites inducing various functionalities as catalytically active sites.

This contribution focuses on three important aspects of present zeolite research:

- 1) challenges in synthesis of zeolites are discussed with a particular attention focused on extra-large pore zeolites and novel 3D 10-ring channel systems,
- 2) adsorption properties of zeolites with an example of determination of adsorption enthalpies of CO₂ on ferrierite with different alkali metal cations. This part provides a comparison of experimental and quantum chemical data.
- 3) role of test reactions for understanding the channel architecture of zeolites. Examples of toluene disproportionation and alkylation with isopropyl alcohol will be highlighted in relation to the structures of 10-ring zeolites.