

'Hierarchically-ordered zeolites: preparation concepts and potential applications'

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In recent years advances have been made in the synthesis and structural characterization of so-called hierarchically ordered zeolites, which combine porosity features of different scale lengths, micro-, meso- and/or (sometimes) macropores in one zeolitic material.

This contribution will give an overview about the ongoing research activities in the field hierarchically organized zeolites covering both, the synthesis strategies and the potential application, mainly in the field of catalysis. A special focus will be laid on the design options of such hierarchical zeolitic systems which offer both, the possibility to overcome the mass transfer limitations of a reaction and allow the catalytic conversion of large molecules on zeolites. However, the extra porosity in hierarchical zeolites often leads to a loss of selectivity of the products. Thus, introducing additional pores with an optimal size has to be combined with the tailoring of their surface properties at the different pore scales in such hierarchical systems. Therefore, novel synthesis routes are required to prepare hierarchical zeolites. In the talk, such preparation pathways will be described and classified. Special preparation routes to two catalytically important and hierarchically zeolites, zeolites of the MFI and FAU type, will be highlighted. This includes in particular pathways to layered like zeolites assemblies and a new zeolite material with a direct combination of micro and macropores network. Finally, the results of some catalytically reactions to characterize the effect of the hierarchy in the system will be discussed.