

# 'Hierarchical Porous Materials: Preparation Concepts and Potential Application

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In recent years major progress has been made concerning the preparation of highly ordered porous materials with tailored porosities and different structure, controlled surface functionality and their adjustable structure related applications. Advances have also been made in the synthesis and structural characterization of so called hierarchical materials which combining porosity features of different scale lengths combination of micropores and mesopores in mesoporous zeolites and hierarchically organized pore structures with an appropriate balance of micropores, mesopores and macropores.

The contribution will give an overview about the ongoing research activities in the field hierarchical porous materials in Erlangen covering both, the synthesis strategies and the potential application, mainly in the field if catalysis. A special focus will be laid on the design options of hierarchical zeolites. Such hierarchical systems do not only offer the possibility of reducing mass transfer limitations, but they also allow the catalytic conversion of large molecules over 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 a tailoring of the surface properties at the different pore scales in such hierarchical system. Therefore, novel synthesis routes are required to prepare hierarchical zeolites. Thus such preparation pathway will be described and compared. Finally, the results of some catalytically test reactions will be shown to characterize the effect of the hierarchical system.