POROUS MATERIALS FOR CATALYTIC APPLICATIONS

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Transition metal-modified microporouszeolitic materials (silicate- and phosphate-based) are attractive catalysts due to their hydrothermal stability and high catalytic activity and selectivity. Metal-modified mesoporous materials with larger pore openings have been developed for catalytic processes where larger molecules are involved. The inclusion of nanosized particles of zeoliticmicroporous materials with larger external surface areas and high surface activity into mesoporous matrices, i.e. the preparation of microporous/mesoporous composites, substantially enhances the catalytic activity of mesoporous materials. The important feature of nanoporous solids based on various metal oxides is also their ability to form thin films with nanometer-scale thickness. Examples of successful preparation and/or functionalisation of new nanoporous solids includemicroporous and mesoporous silicates (MnS-1, MnMCM-41, MnTUD-1), microporous and mesoporousaluminophosphates (FeAPO-36, FeHMA), microporous/mesoporous silicate composites ((Ti, Al)-Beta/MCM-41, (Ti,Al)-Beta/MCM-48, Ti-Beta/SBA-15) as well as cubic mesoporousaluminophosphate thin films. Studies of structure-property relations of new solids have included X-ray diffraction, spectroscopic (XAS, NMR) and electron microscopy characterisation techniques.

Recent results onmaterials for catalytic applications andfor heat and hydrogen storage will be presented.