



Fakultät für Physik und Geowissenschaften  
Abteilung Grenzflächenphysik

Fakultät für Chemie und Mineralogie  
Institut für Technische Chemie

## Kolloquium

gemeinsam

mit dem Internationalen Graduiertenkolleg (IRTG) „Diffusion in Porous Materials“

Am Dienstag, den 9. März 2010, spricht um 13.30 Uhr im Seminarraum 224 der Fakultät für Physik und Geowissenschaften, Linnéstraße 5, 04103 Leipzig,

### **Herr Prof. Dr. Michael Stöcker**

SINTEF Oslo, Norway

zum Thema

### **Toluene Disproportionation and Alkylation Using 3D Interconnected MCM-22**

The effect of the modification of H-MCM-22 zeolite by alkaline treatment was investigated by various characterization techniques and in toluene disproportionation and alkylation with isopropylalcohol. The effect of the alkaline concentration, treatment time and temperature was explored. This 'desilication' process led for mild alkaline concentrations (~ 0.10 - 0.20 M NaOH at 323 K for 45 min) to the partial destruction of the zeolite framework, but also to the formation of additional mesoporosity. Furthermore, the accessibility/availability of Lewis acid sites, investigated by d<sub>3</sub>-acetonitrile and pyridine adsorption using FTIR spectroscopy, increased for these mild alkaline treatments, while the Brønsted acidity decreased. Higher alkaline concentrations (up to 0.50 M NaOH) led to a too severe framework and pore destruction and a decrease in both the Lewis and Brønsted acidic site concentrations. Decomposition and deconvolution of the <sup>29</sup>Si MAS-NMR confirmed the Si extraction and partial framework destruction, since more Q<sub>3</sub> SiOH groups were formed at the expense of the Q<sub>4</sub> T-atoms in the framework. Furthermore, the T<sub>6</sub> and T<sub>7</sub> Si-atoms were preferentially extracted, which would indicate that an interconnection between the intralayer and the interlayer and/or outer surface is formed. The toluene conversion in its disproportionation reaction increased for the mildly treated sample, while the selectivity to xylene isomers (and cymene and n-propyltoluene isomers in the alkylation reaction with isopropylalcohol) was similar to the thermodynamic equilibrium, suggesting that the reaction primarily occurs at outer surface cups of the H-MCM-22 zeolite.

Alle Interessenten sind dazu herzlich eingeladen.

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