

## Supplementary materials

# MCM-41-Type Mesoporous Silicas Modified with Alumina in the Role of Catalysts for Methanol to Dimethyl Ether Dehydration

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### Tests of metanol conversion without catalysts and over pure silica MCM-41

The pure silica MCM-41 sample was tested in the role of the catalyst for methanol dehydration to dimethyl ether (DME). Prior to the catalytic tests the sample powder was pressed, crushed and then sieved to obtain the grain fraction of 250–315  $\mu\text{m}$ . The catalyst sample (100 mg) was placed in flow fixed-bed quartz microreactor on the quartz wool plug and outgassed in a flow of pure helium ( $20\text{ mL}\cdot\text{min}^{-1}$ ) at  $550\text{ }^{\circ}\text{C}$  for 50 min. The catalytic test was carried in the temperature range of  $125\text{--}350\text{ }^{\circ}\text{C}$  with a heating rate of  $10\text{ }^{\circ}\text{C}\cdot\text{min}^{-1}$  using gas mixture containing an alcohol (3.9 vol. % of methanol determined by their volatility at  $0\text{ }^{\circ}\text{C}$ , which was saturation temperature) diluted in helium with the total flow rate of  $20\text{ mL}\cdot\text{min}^{-1}$ . Concentrations of reactants were analysed by gas chromatograph (SRI 8610C) equipped with methanizer and FID detector. The operating temperature of chromatography column (Hayesep D) was  $120\text{ }^{\circ}\text{C}$ . Similar, reference test was done for empty reactor.

### Results

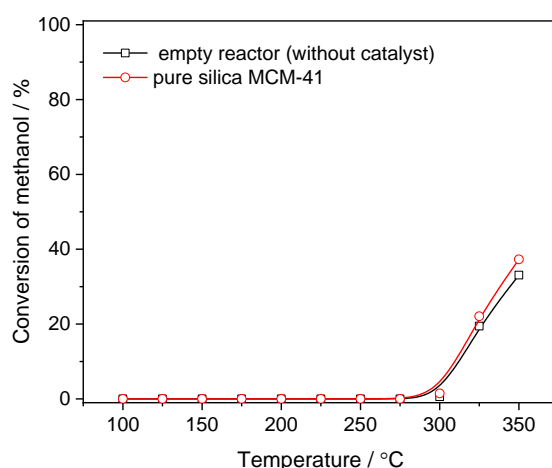


Figure S1. Results of methanol conversion in empty reactor and in the presence of pure silica MCM-41.

The methanol conversion without catalyst and in the presence of pure silica started at about  $300\text{ }^{\circ}\text{C}$  (Figure S1), and the only reaction products were CO,  $\text{CH}_4$  and formaldehyde. Formation of DME was not detected in the studied temperature range.