

Mesoporous MEL, BEA, and FAU zeolite crystals obtained by in situ formation of carbon template over metal nanoparticles - DTU Orbit (08/11/2017)

Mesoporous MEL, BEA, and FAU zeolite crystals obtained by *in situ* formation of carbon template over metal nanoparticles

Here, we report the synthesis and characterization of hierarchical zeolite materials with MEL, BEA and FAU structures. The synthesis is based on the carbon templating method with an *in situ*-generated carbon template. Through the decomposition of methane and deposition of coke over nickel nanoparticles supported on silica, a carbon-silica composite is obtained and exploited as a combined carbon template/silica source for the zeolite synthesis. The mesoporous zeolite materials were all prepared by hydrothermal crystallization in alkaline media followed by removal of the carbon template by combustion, which results in zeolite single crystals with intracrystalline pore volumes of up to $0.44 \text{ cm}^3 \text{ g}^{-1}$. The prepared zeolite structures are characterized by XRD, SEM, TEM and N_2 physisorption measurements.

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