LOUISIANA TECH UNIVERSITY

Synthesis Hierarchical Zeolites by Template-free Assembly and Solid-State Crystallization

(ROI #2016-10)

Description

- Novel solid state crystallization with dry nanogels, not aqueous suspensions, used in zeolite crystallization
- Template-free assembly nanogels with well-defined domains for simultaneous nucleation
- The unique inter-crystal mesoporous structure with jointed nanocrystals as a single piece zeolite.

Advantages

(1) Precise regulation of nanocrystal size with confined crystallization within dry nanogels.
(2) Maximum exposure of active sites of zeolites without sacrifice of diffusion promotion with unique inter-crystal mesoporous structure
(3) High stability with jointed nanocrystalls as a single piece zeolite
(4) Low cost for no involvement template materials and issues on their availability, toxicity, and compatibility.
(4) Environment-friendly synthesis route with its solid crystallization, avoiding the generation of waste and environmental hazards (i.e., no diluted post-synthesis alkali, silicates, and aluminates aqueous waste.

Areas of Application

- various chemical processes including alkylation, aromatization, cracking, pyrolysis, and hydrodesulfurization

Patent Status

- Patent pending

Publications

- Wang et al, Environment-friendly Synthesis of Hierarchical ZSM-5 Zeolites by Solid-State Crystallization and Their Catalytic Properties, *under review*.

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