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Direct Hydrothermal Synthesis of Palladium-Incorporated Silicate-Structured Mesoporous Catalysts

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Abstract: Pd-Si-structured novel mesoporous nanocomposite catalytic materials, having quite high Pd/Si ratios, were synthesized by an acidic direct hydrothermal synthesis route. The nanocomposite catalytic materials were then characterized by XRD, XPS, EDS, nitrogen adsorption, and SEM techniques. Unlike MCM-41, the XRD patterns indicated a rather wide $d_{(100)}$ band at a 2θ value of about 1.9. The materials, with very high Pd/Si wt ratios between 1.43 and 2.66, were synthesized and had BJH surface area values between 600 and 200 m^2/g. The pore size distributions of these materials were also quite narrow, indicating pores between 2 and 7 nm.

Key Words: Mesoporous catalysts, MCM-41, Pd, hydrothermal synthesis, reforming

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