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Synthesis of Mg promoted Ni-based nanocomposite catalyst for methane dry reforming

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The methane dry reforming (DRM) simultaneously converts two greenhouse gases, CH₄ and CO₂, into syngas (CO+H₂) which is significant for both environment and industry. Adding basic promoters is considered as an effective way to improve the coking resistance of DRM catalysts, although challenge remains in the control over the structure, morphology and interaction of the promoter in the catalyst. In this work a Ni/MgO-SiO₂ catalyst was synthesized through a facile one-pot hydrothermal process, during which Ni-phyllsilicate formed as the precursor of Ni particles and MgO promoter was generated in form of Mg-phyllsilicate. This Ni/MgO-SiO₂ had a hierarchical hollow sphere structure with large surface area (477.4 m²/g). Both the Ni particles (avg. 6.0 nm) and MgO promoter uniformly distributed. This hollow hierarchical catalyst performed high activity, thermal stability and coking resistance in the catalytic reaction of DRM.

Biography

Peng Zhang obtained his PhD degree from University of California, Davis and did postdoctoral studies at of California, Santa Barbara. He is a professor of inorganic nano-materials for energy and environment. He has published more than 60 papers in reputed journals.

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