Synthesis of Nanostructured Catalytic Materials for Selective Conversion of Hydrocarbon

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Control of chemical reaction to produce a desired product with high yield is of important issue in view of energy-saving green chemistry involving heterogeneous catalyst. Synthesis of well-defined nanostructured catalysts is one of the resolutions to achieve this goal. For example, size- or shape-controlled metal nanoparticles with high uniformity can be used for selective conversion of raw chemicals to value-added chemicals with high selectivity. In this presentation, Pt metal nanoparticles incorporated various porous materials such as hierarchically nanoporous zeolites, mesoporous aluminosilicate, and metal-organic frameworks have been prepared. The resultant metal nanoparticles supported on various porous materials with controlled physicochemical properties are investigated in hydrocarbon conversion reaction using methylcyclopentane or n-hexane as model reactant, which can make catalytic synergies such as enhancement of catalytic activity, and change in product selectivity. Detailed results and correlation data between the catalytic phenomenon and catalytic properties will be discussed in this presentation.