

Support Effect of Ni Catalysts for Dry Reforming of Methane Reaction : Independent of Ni metal properties

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Recently, a demand for alternative energy resource is increased because of lack of fossil energy resource and greenhouse effect caused by greenhouse gases such as CO₂ and CH₄. To not only reduce greenhouse gases but also generate energy source or syngas, dry reforming of methane (DRM) reaction has studied actively. Among various transition metal catalysts, Ni catalysts show high activity for this reaction with very cheap cost comparing with other precious metal catalysts. It is well known that activity of Ni based catalysts were affected by its support. To clarify precise support effect, however, other catalytic properties (especially Ni particle size) must be same to eliminate other effects such as particle size effect. Here, we have synthesized various metal oxide (Al₂O₃, ZrO₂, TiO₂, SiO₂) coated Ni/SiO₂ catalysts with 5.2nm sized Ni nanoparticle and applied them to DRM reaction. The embedded Ni particle size was preserved in harsh DRM reaction condition. Obtained DRM results showed that activity was changed as different coating material (inverse-support) were used.