

Propylene Self-Metathesis to Ethylene and Butene over WO_x/SiO₂, Effect of Nano-Sized Extra Supports (SiO₂ and TiO₂)

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Abstract : Propylene self-metathesis to ethylene and butene was studied over WO_x/SiO₂ catalysts at 450 °C and atmospheric pressure. The WO_x/SiO₂ catalysts were prepared by incipient wetness impregnation of ammonium metatungstate aqueous solution. It was found that, adding nano-sized extra supports (SiO₂ and TiO₂) by physical mixing with the WO_x/SiO₂ enhanced propylene conversion. The UV-Vis and FT-Raman results revealed that WO_x could migrate from the original silica support to the extra support, leading to a better dispersion of WO_x. The ICP-OES results also indicate that WO_x existed on the extra support. Coke formation was investigated on the catalysts after 10 h time-on-stream by TPO. However, adding nano-sized extra supports led to higher coke formation which may be related to acidity as characterized by NH₃-TPD.

Keywords : extra support, nanomaterial, propylene self-metathesis, tungsten oxide

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