World Academy of Science, Engineering and Technology
International Journal of Chemical and Materials Engineering
Vol:9, No:05, 2015

Propylene Self-Metathesis to Ethylene and Butene over WOx/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 WOx/SiO2 catalysts at 450 °C and atmospheric pressure. The WOx/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 WOx/SiO2 enhanced propylene conversion. The UV-Vis and FT-Raman results revealed that WOx could migrate from the original silica support to the extra support, leading to a better dispersion of WOx. The ICP-OES results also indicate that WOx 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
Conference Title : ICCPE 2015 : International Conference on Chemical and Polymer Engineering
Conference Location : Rome, Italy
Conference Dates : May 05-06, 2015

Open Science Index, Chemical and Materials Engineering Vol:9, No:05, 2015 publications.waset.org/abstracts/25494.pdf