Iminodiacetic acid functionalized MIL-101 supports nano-platinum as heterogeneous catalyst for hydrosilylation of Alkene

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Abstract

The hydrosilylation is one of the largest scale applications for homogeneous catalysis and is widely used to commercialize silicon products. However, the development of highly versatile heterogeneous catalytic systems to efficiently catalyze the hydrosilylation of alkenes remains a significant challenge. This work used a heat-assisted impregnation method followed by a mild reduction with sodium borohydride to will support a catalyst of platinum (Pt/IDA-MIL-101) supported on amine and carboxyl functionalized Metal-Organic Frameworks (MOFs) allowing for alkenes hydrosilylation reaction. IDA plays a key role in forming platinum nanoparticles that are uniform and well dispersed. More interestingly, IDA changes the pore size of the MIL-101 during the experiment. The Hydrosilylation experiments of olefins show that the reaction can effectively catalyze alkenes without solvents. Also, the synthetic heterogeneous catalyst Pt/IDA-MIL-101 achieves reasonable utilization of Pt in terms of cycle number and atomic utilization, demonstrating the potential for achieving a green hydrosilation industry.

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