

Controlling Surface Morphology of Core-Shell Al@ $\gamma$ -Al<sub>2</sub>O<sub>3</sub> Nanoparticles for Acid Catalysts

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Gamma alumina ( $\gamma$ -Al<sub>2</sub>O<sub>3</sub>) is mainly used to heterogeneous catalyst support, but it could be used to an acid catalyst also, because of its Lewis acid sites and Brønsted acid sites. Core-shell Al@ $\gamma$ -Al<sub>2</sub>O<sub>3</sub> nanoparticle could be synthesized by two steps : fabrication of Al@ $\gamma$ -AlOOH (boehmite) by surface oxidation of aluminum metal powder and calcination. Boehmite, is the primary precursor for the preparation of alumina, having different morphologies could be fabricated with hydrothermal reaction conditions. The boehmites' particle morphologies could be controlled to 3D nano-hexahedron, 2D nanoplate, and 1D nanorod, depending on hydrothermal reaction conditions without additives, with ammonium chloride and magnesium chloride, respectively. And the alumina with different morphologies originated from the boehmite have different crystal facet ratio. In this research, performance as an acid catalyst of the Al@ $\gamma$ -Al<sub>2</sub>O<sub>3</sub> with different crystal ratio was evaluated by using ethanol dehydration.

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