



Indole HDN Using Iridium Nanoparticles Supported on Titanium Nanotubes

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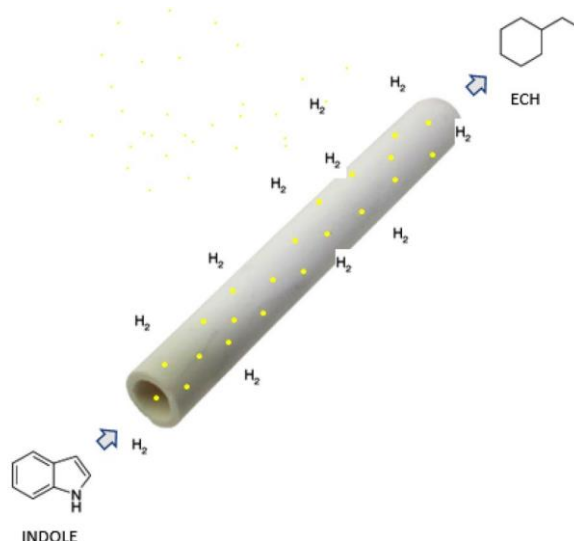
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Abstract

The HDN of indole was studied over iridium modified titanate nanotube catalyst. Titanium nanotube was prepared by the alkaline hydrothermal method. Iridium was added by wetness impregnation. The activity was compared with Ir–TiO₂ and commercial NiMo/Al₂O₃ catalysts. The catalysts prepared were characterized by X-ray diffraction (XRD), N₂ adsorption isotherms, UV–Vis-DRS, FTIR, XPS, TEM, Py-FTIR and H₂-Chemisorption. XRD, N₂ isotherms and UV–vis-DRS confirmed the nanotube structure. The analysis showed that the mesoporous structure was maintained after Ir incorporation. The results showed that titanate nanotube as support significantly reduce the size of iridium crystallites and improves its dispersion considerably. Iridium titanate nanotube presented abundant and strong Brønsted acidity compared with TiO₂ iridium catalyst. According a kinetic study, Ir–TNT was the most active catalyst for indole HDN, in mild conditions in a Batch reactor. The Brønsted acidity in synergic effect with Lewis acidity and hydrogenolysis capacity of iridium species were the responsible for the good activity.

Graphical Abstract



Keywords Hydrodenitrogenation · Titanium · Indole · Iridium · Nanotubes · Catalysts

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