

Worawat Wattanathana 2012: Preliminary Study of Pd/CeO₂ Derived from Cerium Complexes as Solid Support Catalysts for Hydrogenation Reaction in a Micro-reactor. Master of Science (Chemistry), Major Field: Chemistry, Department of Chemistry. Thesis Advisor: Associate Professor Nattamon Koonsaeng, Ph.D. 55 pages.

This work was studied on the Pd/CeO₂ used as catalyst for hydrogenation reaction in micro-reactor. A simple cerium complex for CeO₂ was prepared from cerium nitrate and triethanolamine in 1-propanol. The feasible structures of cerium complexes as four-coordinate and five-coordinate Ce-TEA complexes were determined by ESI-MS and FTIR. By calcining the Ce-TEA complexes at 600°C for 2 h, the single phase of CeO₂ identified by XRD was obtained. Pd/CeO₂, the hydrogenation catalyst, was prepared by doping palladium nitrate into the cerium complex before calcining at 600°C for 2 h and investigated by XRD and SEM. The Pd-doped CeO₂ was preliminarily studied for catalytic hydrogenation of 4-cyanobenzaldehyde in a continuous-flow micro-reactor. Among all Pd/CeO₂ prepared, 10% Pd doped CeO₂ exhibited the greatest performance towards hydrogenation of 4-cyanobenzaldehyde in terms of the amount of hydrogenated products as 4-cyanobenzyl alcohol, 4-hydroxymethylbenzylamine, and 4-hydroxymethyltoluene.

Student's signature

Thesis Advisor's signature