

Benzoylation of anisole catalyzed by Ga/SBA-15 supported on carbon nanofibers composite

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Abstract :

Carbon nanofiber composite (C-NFC) shows several advantages compared to the conventional supports which are usually employed in catalysis such as alumina, silica or activated charcoal. In this present work we have developed a new hybrid catalyst consisting of SBA-15 supported on C-NFC for the benzoylation reaction. The structured materials allow an important improvement of the reaction hydrodynamics and favor the mass transfer between the active phase and the reactants, especially in the liquid-phase medium, thus improving the selectivity toward desired products and increase the catalyst stability. The Ga/SBA-15(10)/C-NFC composite was further used as catalyst for Friedel–Crafts acylation of anisole in slurry bed. Cycling tests confirm the gradual deactivation of the catalyst which could be attributed to the pore plugging by carbonaceous residue which render inaccessible the active site localized inside the mesoporous channel to the reactant. These active sites localized inside the mesoporous channel are expected to be responsible for the para product formation by shape selectivity and thus, only the ortho product, which is formed on the gallium sites localized on the pore mouth, is observed on the deactivated catalyst. Such hypothesis is confirmed by depositing gallium phase on the poreless carbon nanofiber.

Keywords : SBA-15; Carbon nanofibers; Gallium; Supported SBA-15; Benzoylation.

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