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Adhesive Catalyst Immobilization of Palladium Nanoparticles on Cotton and Filter Paper: Applications to Reusable Catalysts for Sequential Catalytic Reactions

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Adhesive Immobilization of Polymer-Stabilized Pd Nanoparticles on Cellulose

Category

Polymer-Supported
Synthesis

Key words

solid-supported
catalysis

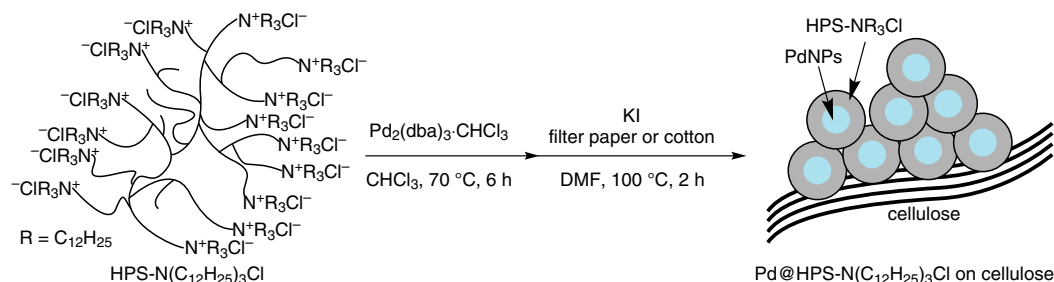
cellulose

hyperbranched
polymers

ammonium salts

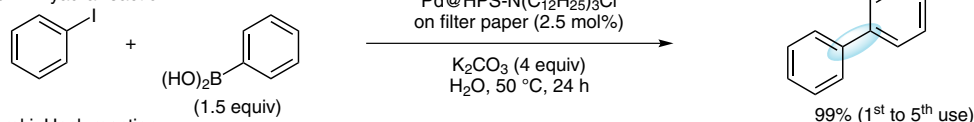
palladium

SYNFACT
of the month

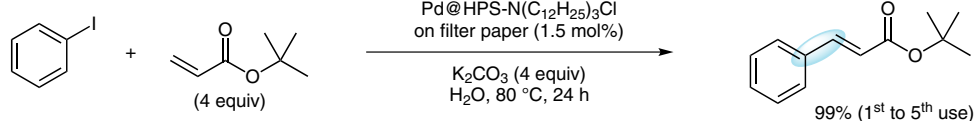


Selected examples:

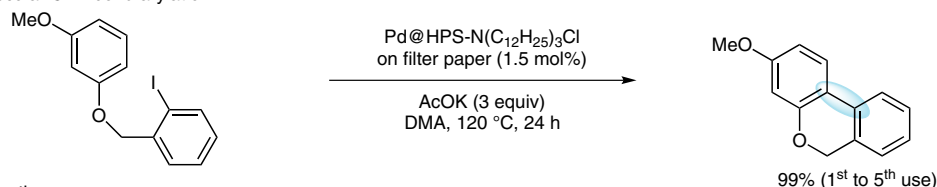
Suzuki–Miyaura reaction:



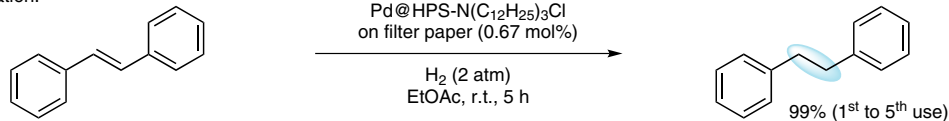
Mizoroki–Heck reaction:



Intramolecular C–H bond arylation:



Hydrogenation:



Significance: Adhesive immobilization of palladium nanoparticles on cellulose using hyperbranched polystyrene [Pd@HPS-N(C₁₂H₂₅)₃Cl on cellulose] was developed. The catalyst promoted efficiently the Suzuki–Miyaura coupling, the Mizoroki–Heck reaction, the intramolecular C–H bond arylation, and the hydrogenation. The catalyst was recycled by a tweezers and reused several times.

Comment: The catalyst was prepared as follows: A reaction of the hyperbranched polystyrenes having tri(dodecyl)ammonium chloride moieties [HPS-N(C₁₂H₂₅)₃Cl] with Pd₂(dba)₃ was carried out to give the polymer-supported palladium nanoparticles Pd@HPS-N(C₁₂H₂₅)₃Cl. The resulting nanocomposite Pd@HPS-N(C₁₂H₂₅)₃Cl was treated with KI and filter paper (or cotton) as cellulose to afford Pd@HPS-N(C₁₂H₂₅)₃Cl on cellulose.

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