

Rhodium-catalyzed hydroformylation under green conditions: aqueous/organic biphasic, “on water”, solventless and Rh nanoparticle based systems.

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Streszczenie

Hydrofomylation is an important industrial process for aldehyde production which follows the atom-economy principle. In this homogeneous process, the separation and subsequent recycling of the expensive catalyst are fundamental problems. In the Ruhrchemie/Rhone-Poulenc process, hydroformylation is carried out in water and the soluble rhodium catalyst is separated and reused. However, long chain olefins, less soluble in water, are not suitable for this process. Current research is focused on the development of methodologies applicable to longer olefins and compatible with green chemistry rules. Hydroformylation can be carried out using an aqueous/organic biphasic medium or in solventless conditions. Different modifications, including phase transfer agents, surfactants or cyclodextrins were introduced to improve the hydroformylation process in water. In terms of water application, the “on water” strategy applicable to fully hydrophobic systems has been illustrated for different substrates, such as alcohols, esters and dienes. The use of Rh NPs (Rh nanoparticles) as a rhodium source in hydroformylation, as an alternative to soluble coordination compounds, was also shown.

Słowa kluczowe

Biphasic hydroformylation, Rhodium, Solventless, On water, Nanoparticles

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