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d-Block Metal Nanoparticles Confined in Triphenylphosphine Oxide Functionalized Core-Crosslinked Micelles for the Application in Biphasic Hydrogenation

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Abstract : The use of soluble polymer-supported metal nanoparticles (MNPs) has received significant attention for the ease of catalyst recovery and recycling. Of particular interest are MNPs that are supported on polymers that are either soluble or form stable colloidal dispersion in water, as this allows to combine of the advantages of the aqueous biphasic protocol with the catalytical performances of MNPs. The objective is to achieve good confinement of the catalyst in the nanoreactor cores and, thus, a better catalyst recovery in order to overcome the previously witnessed MNP extraction. Inspired by previous results, we are interested in the design of polymeric nanoreactors functionalized with ligands able to solidly anchor metallic nanoparticles in order to control the activity and selectivity of the developed nanocatalysts. The nanoreactors are core-crosslinked micelles (CCM) synthesized by reversible addition-fragmentation chain transfer (RAFT) polymerization. Varying the nature of the core-linked functionalities allows us to get differently stabilized metal nanoparticles and thus compare their performance in the catalyzed aqueous biphasic hydrogenation of model substrates. Particular attention is given to catalyst recyclability.

Keywords : biphasic catalysis, metal nanoparticles, polymeric nanoreactors, catalyst recovery, RAFT polymerization
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