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Engineering and performance of ruthenium complexes immobilized on mesoporous siliceous materials as racemization catalysts

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Dynamic kinetic resolution (DKR) is one of the most attractive routes to enantioselective synthesis, and ruthenium complexes are often applied as racemization catalysts. Two substituted cyclopentadienyl ruthenium complexes were immobilized covalently and non-covalently on mesoporous silica of mesocellular foam (MCF) and Santa Barbara Amorphous (SBA)-15 type functionalized with a 3 carbon spacer and 4-(chloromethyl)-N-amidobenzoate moiety. The catalysts were studied in a model reaction of secondary alcohol racemization. The immobilization decreased catalyst activity, considerably more for SBA-15 than for MCFs, and complete racemization of 1-phenylethanol was achieved within 24 h with the MCF-supported catalyst. The catalyst could be recovered and reused, thus paving the way for further development of the DKR process. The synthesized materials were fully characterized by Fourier-transform infrared spectroscopy analysis, thermogravimetry analysis, inductively cou-pled plasma optical emission spectrometry, and nitrogen adsorption at 77 K.

Metryczka

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