

Institute of Chemical Engineering

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Monolithic microreactors of different structure as an effective tool for in flow MPV reaction

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Silica monolithic microreactors of the same topology of the skeleton but different pore sizes were functionalized with zirconium isopropoxide ($Zr/Si = 0.14$), and they were studied in Meerwein-Ponndorf-Verley (MPV) reduction of cyclohexanone using n-butanol as a hydrogen donor. It was shown that the concentration of Lewis acid sites was proportional to the value of the specific surface area, and this directly translated into the higher reaction rate, larger TOF-value and productivity. The monolith with the largest surface area, 625 m²/g was characterized by the small flow-through pores (2 μm), and thus very high flow resistance. Catalytic studies confirmed the first order kinetics of MPV reduction, and that the overall/observed reaction rate depends on the rate of the intrinsic chemical reaction and internal diffusion. Moreover, the higher efficiency of zirconium functionalized mesoporous catalysts over homogeneous zirconium isopropoxide has been demonstrated in batch process.

Metryczka

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