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Engineering aspects of catalysis in microreactors

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Abstract

Microreactors are said to be very efficient tools for the process intensification and kinetic and mechanistic studies of many types of catalyzed reactions. Is this really true or are there also any disadvantages of this approach? Are the microreactors the universal solutions or should we expect difficulties during their implementation in the given process? Is the scale-up of microreactors as simple as advertised? Is micro always better?

We will try to answer these and similar questions by giving examples of several cases, in which we studied microreactors in relation to different catalytical systems. The presented cases will include the heterogeneously catalyzed gas phase reactions (oxidation of SO₂, hydrogenation of 2-methylpropene), heterogeneously catalyzed enzymatic glycerolysis of vegetable oil, photochemical debromination of PBDE, and homogeneously catalyzed photochemical oxidation of 4-chlorophenol. We will present some surprising results and comparisons with conventional reactors.