

Recycling Strategies for Homogeneous Catalysts in the Convention of Oleochemicals – Two Innovative Approaches

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Abstract

Environmental awareness and sustainability are becoming increasingly important in the chemical industry. One important aspect is the implementation of renewable resources in chemical processes. The homogeneous catalyzed hydroformylation of unsaturated long-chain oleo compounds is an interesting direction for adding value to renewables. In this context the recycling of a homogeneous catalysts is a major challenge. This is particularly true in carbonylation reactions of oleobased structures, since these compounds often have high boiling points or a high functional level. To eliminate this problem, suitable catalyst recycling strategies such as the use of thermomorphic multicomponent solvent (TMS) systems and selective product crystallization for easy separation are promising. A TMS takes advantage of the temperature dependent miscibility gap of a polar and a non-polar solvent.

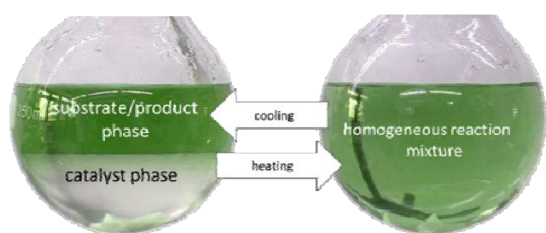
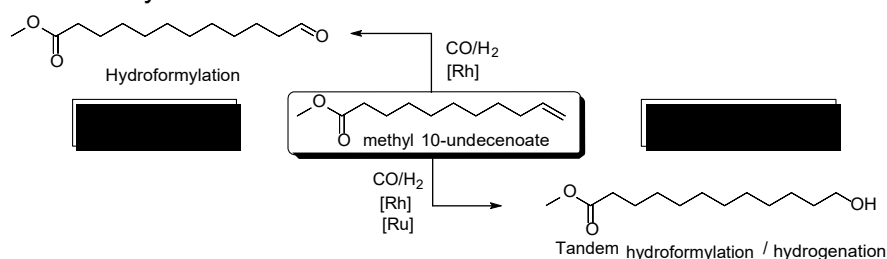


Fig.1. TMS system



Fig.2. crystallization

The hydroformylation and the tandem hydroformylation / hydrogenation of methyl 10-undecenoate show good yields of the linear hydroformylation product or the corresponding alcohol. The TMS system and the product crystallization give very low leaching results. These innovative methods are very good approaches to reduce leaching and to ensure the recycling of bimetallic systems.



[1] T. Gaide, J. Dreimann, A. Behr, A.J. Vorholt, *Angew. Chem. Int. Ed.*, **2016**, 55, 2924-2928.