

Homogeneous Carbonylation Catalysis in Ionic Liquids – Supported, or Not Supported, that is the question

A. Riisager

Centre for Catalysis and Sustainable Chemistry, Department of Chemistry, Technical University of Denmark, Kgs. Lyngby, Denmark

E-Mail presenting author: ar@kemi.dtu.dk

In the past 25 years, ionic liquids (ILs) have been established as attractive materials in many diverse and important fields of chemical applications, including homogeneous catalysis. A major reason behind the success is attributed to the physiochemical characteristics and options for alteration of ILs (e.g., negligible vapor pressure, high thermal/chemical stability, solubility for a wide range of compounds, modification with added functionalities), which allows their use in biphasic processes with a recyclable liquid IL-catalyst phase. However, an inherent concern when using (often viscous) ILs in liquid biphasic catalysis is interfacial mass transfer. An innovative approach to avoid such mass transfer is to apply Supported Ionic Liquid-Phase (SILP) technology, where the catalyst is immobilized in a thin IL film in a porous solid material. The large potential of SILP technology has been demonstrated for several homogeneously catalyzed gas-phase process types with high industrial relevance, such as carbonylation, hydroformylation, hydroamination, hydrogenation, oxidation and epoxidation, yielding both excellent catalytic performance and catalyst stability [1].

This presentation will highlight our work on designing new prospective IL catalyst systems and processes for methanol carbonylation into acetic acid and alkoxy-carbonylation of alkenes into acrylate precursors using biphasic IL and SILP technology.

[1] P. Latos *et al.*, *Materials*, 2023, **16**, 2106, doi.org/10.3390/ma16052106 and cited refs.