

## Multi-functional catalysts for process intensification

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Dissolving organometallic complexes in supported films of ionic liquids has recently been introduced as strategy to immobilize metal organic compounds. This allows preparing molecular catalysts in a widely tailorable environment without the drawbacks of complex grafting chemistry. This novel class of materials enables to merge the advantageous of homogeneous and heterogeneous catalysts. Different functionalities can be combined in a single material. However, the influence of an environment with high dielectric constant on structure and reactivity of the complexes remains unknown. In this paper, bi-functional catalysts on the basis of supported ionic liquids were explored for various applications, such as enantioselective hydrogenation, hydroamination of alkenes as well as the water-gas-shift reaction. It is demonstrated that the catalysts combine exceptional activity with custom-tailored selectivity. Detailed characterization provided experimental evidence for the formation of supramolecular structures in solutions of organometallic complexes in thin films of supported ionic liquid. The ordering effect leads to drastically reduced mobility of ionic liquid and complex molecules, and can be used to induce unusual properties in the supported complexes.

Keywords:

Immobilisation, Supported ionic liquid, Heterogeneous catalysis, Bi-functional, Structure-activity relationship