

### Advanced supported ionic liquid phase (SILP) materials for intensified hydroformylation processes

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Novel Supported Ionic Liquid Phase (SILP) materials consist of an ionic liquid, dispersed as a thin film on the inner surface of a highly porous solid material. By dissolving homogeneous transition metal complexes in the ionic liquid film, the SILP concept allows tailor making of solid materials with definite properties and a controlled chemical reactivity. Since the ionic liquid is dispersed on the inner surface of the support, a dry solid material is obtained. These materials can be handled like classical heterogeneous catalysts and are highly attractive for large scale applications. Due to the extremely low vapour pressure of ionic liquids, the SILP concept is especially suited for continuous gas-phase reactions. No leaching of ionic liquid and catalyst can occur via the gas-phase and the SILP catalyst remains intact under steady state conditions for more than 1000 hours time on stream. Since the catalyst is retained inside the reactor, only products and non-converted substrates leave the reactor, thus simplifying the downstream processing significantly. In this contribution we highlight the latest developments from our research with SILP catalyst materials in syngas applications, namely hydroformylation of technical feedstock containing mixed alkenes. Excellent performance with regard to activity, selectivity and stability is obtained, thus making these SILP catalysts highly attractive for industrial applications.