Supported ionic liquid phase (SILP) catalysts for ambient pressure and ultra-low temperature water-gas-shift reaction

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Supported ionic liquid phase (SILP) catalysts are new materials consisting of an ionic liquid, a metal catalyst and a porous support. The catalyst is dissolved in the ionic liquid which itself is dispersed as a thin film on the inorganic support, thus bridging the gap between traditional homogeneous and heterogeneous catalysis. Especially continuous, gas-phase reactions are highly suited for this novel and innovative technology. An industrially important example is the water gas shift (WGS) reaction, by which hydrogen can be generated from carbon monoxide and water. Homogeneous WGS catalysts operate at milder temperatures than commercial heterogeneous systems. Since hydrogen production via WGS is an exothermic reaction, lower temperatures result in higher equilibrium conversions. In this contribution we present investigations of homogeneous metal complexes active in the water gas shift reaction which have been immobilized by the SILP technique. The investigated SILP systems exhibit activities and stabilities exceeding those of homogenous systems reported in literature. Even commercially available WGS catalysts are outperformed, indicating that SILP derived WGS catalysts may become a promising alternative to conventional heterogeneous systems.