Surface and Interface Science Studies of Advanced SCILL and SILP systems

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Over the past two decades, novel catalysis strategies using thin ionic liquid (IL) coatings, such as Supported Ionic Liquid Phase (SILP) and Solid Catalyst with Ionic Liquid Layer (SCILL), have emerged.[1] While a SILP catalyst is homogeneously dissolved in a thin IL film on a high-surface area support, the IL layer in SCILL acts as modifier of a heterogeneous catalyst to enhance selectivity, activity, and stability. We have investigated surfaces and interfaces of model systems to understand surface enrichment/depletion effects, wetting, reactions, and thermal stability in Advanced SILP and SCILL (Figure 1). Recent angle-resolved X-ray photoelectron spectroscopy and molecular beam studies reveal insights into surface enrichment of metal complexes in ILs ("buoy effect")[2] and selective hydrogenation of olefins at IL-platinum interfaces.[3]

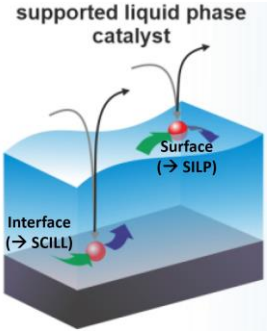

Figure 1: Surfaces and interfaces of interest in the context of Advanced SILP and SCILL

[1] H.-P. Steinrück *et al.*, Adv. Mater., 2011, **23**, 2571, 10.1002/adma.201100211.
[2] D. Hemmeter *et al.*, Chem. Eur. J., 2023, **29**, e2022033, 10.1002/chem.202203325.
[3] L. Winter *et al.*, ACS Catal., 2023, **13**, 10866, 10.1021/acscatal.3c02126.