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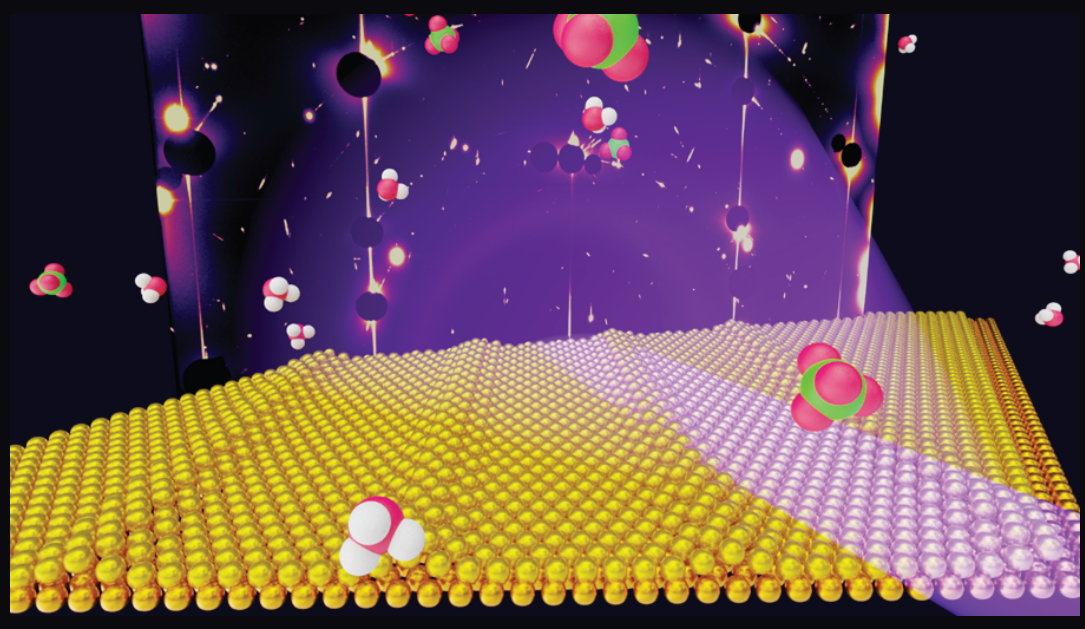
Edvin Lundgren

Operando High-Energy Surface X-ray Diffraction Studies of Model Catalysts and Electrodes



Catalysis is an important process and is widely applied on an industrial scale for a large number of applications in gas or in liquid phase. Industrial catalysts are complex materials, and as a consequence, the gas/liquid-surface interaction between simplified single-crystal surfaces and molecules in controlled environments has been studied for decades. We have in recent years explored the possibility of performing experiments at conditions closer to those of a technical catalyst, in particular at elevated pressures and in an electrolyte. In this contribution, recent results using high-energy surface x-ray diffraction (HESXRD) combined with other *in situ* techniques will be presented. Armed with structural knowledge from ultra-high vacuum experiments, the gas- or electrolyte-induced structures can be identified and related to changes in the reactivity. The strength and weaknesses of the experimental techniques will be discussed.

Edvin Lundgren is a professor at the physics institute at Lund University, Sweden. Lundgren received his Ph.D. at Lund University in 1996 and spent two years at the ESRF, France, and three years at TU-Wien, Austria, before returning to Lund. His research is focused on surface structures on the atomic scale and applying *in situ* synchrotron-based techniques to material systems under working conditions. The research has led to the discovery of a new set of ultrathin oxides on late transition metals, atomic scale views on nano structures such as quantum dot and nanowire surfaces, and pioneering work on *in situ* studies of model catalysts and electrodes at work.

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