The role of precatalysts and their transformation conditions in the oxygen evolution reaction

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Due to the weather dependent fluctuations of solar and wind power plants, highly scalable energy storage technologies are required to meet the constant energy demand of society. In regard of scalability, chemical energy stored in fuels is beneficial compared to batteries as merely tanks instead of energy and resource demanding batteries must be constructed. In electrochemical water splitting, electricity is transformed into chemical energy in form of the fuel H_2 forming at the cathode. At the anode, the oxygen evolution reaction (OER) takes place, and this anodic, economically non-valuable process is responsible for most of the efficiency loss. Various Mn, Fe, Co, Ni based materials with various anions have been investigated as potential catalysts for the OER. *In situ* and *post* catalytic characterization have shown that most of these materials transform during the harsh OER conditions to layered (oxy)hydroxides (LOH).# Several open questions concerning these *in situ* formed LOH remain such as: an explanation for their strongly varying activities, or the effect of the precatalyst structure, leaching anions, and transformation conditions on the formed LOH. In this talk, the role of the precatalyst materials and of the conditions in which they are transformed is discussed regarding the finally formed catalyst. Further, a technical aspect, the pH of aqueous alkaline hydroxide solutions, and an economic aspect, the direct use of seawater in electrolysers, is debated.