

From Active Catalysts to Efficient Electrolysers – Holistic and Sustainable Electrochemistry at Fraunhofer UMSICHT

Siegmund, D.^{1,2}, junge Puring, K.¹, Apfel, U.-P.^{1,2}

¹Fraunhofer Institute for Environmental, Safety and Energy Technology UMSICHT

²Ruhr University Bochum

Abstract

The growing global demand for environmentally friendly technologies to circumvent the anthropogenic climate change has led to increasing interests in electrolysis technologies. When driven by renewable energies, electrolysis can become a game-changing technology for futures energy storage applications and the production of industrially important commodity and fine chemicals. These encouraging perspectives triggered enormous efforts for designing electrocatalysts, especially for the production of hydrogen and the reduction of CO₂. However, an industrially relevant electrolyser can only be achieved in a perfect interaction of the innovative catalyst with the components of an electrode and the electrolyser. We are convinced that meaningful progress requires a holistic view of an electrolysis cell and the synergetic work of engineers and chemistry from academia and industry to advance the technology. Herein, we present our state-of-the-art progress in designing functional electrodes for electrocatalytic conversions while at the same time emphasizing the necessary steps to achieve an electrocatalytic process with an industrial potential.

