CatLab
CATALYSIS LABORATORY

CatLab Lecture Series hosted by FHI and HZB

Friday, December 1st 2023, 10:30-12:00
BESSY II, Seminar Room at the Entrance, Albert-Einstein-Straße 15, Berlin Adlershof

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Thin-film electrocatalysts for long-term energy conversion

Electrochemistry plays a pivotal role in our future transition to sustainable energy, particularly for the conversion of electrical into chemical energy in electrolyzers,Í and the reverse conversion and utilization of the stored energy in batteries and fuel cells. The common challenge in these electrochemical devices is the development of active and durable materials for the catalysis. The main prerequisite for the rational design of catalysts with superior performance is an overall understanding of the interplay between structure and function and mechanisms occurring under the operation conditions. This is however often challenging since electrocatalytic performance depends on various factors, e. g. chemical composition, electronic and atomic-scale structure, conductivity, texture and morphology among others.

Our group develops a promising strategy to tune all abovementioned parameters at once by using thin-film-based catalysts prepared by co-sputtering approach. This method as opposed to conventional synthesis methods allows one to control composition, purity, stoichiometry and structure of multicomponent catalyst very precisely. In this talk the interplay between the atomic scale structure of thin-film catalyst materials and their catalytic activity and stability will be discussed. Special focus will be placed on the temporal evolution of the topmost atomic layers of model catalysts induced by electrochemical reactions and possible strategies for stabilization of active species at the catalytic surfaces.