

CatLab Lecture Series hosted by FHI and HZB

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**Friday, November 3<sup>rd</sup> 2023, 10:30-12:00**

BESSY II, Seminar Room at the Entrance, Albert-Einstein-Straße 15, Berlin Adlershof

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## **Model systems in catalysis research**

Model catalysts are specifically designed to address the complexity issue in catalysis. Real catalysts are very complex, which makes them a nightmare for scientists seeking to understand how these systems work. Typically, only a small part of the catalyst's compositional and structural spectrum is relevant for the catalytic process. Consequently, much of the spectral and structural information stems from irrelevant parts of the catalyst, making the identification of relevant components a non-trivial and error-prone task.

One strategy to handle this issue is the use of model systems, which are simplified versions of real catalysts. Simpler, more straight-forward experimental data may be expected. The models may be crystalline but less simple versions could also be made. There is a significant probability that the catalytically relevant active sites are not part of the structural and compositional spectrum of the as-prepared model, and therefore systematic modifications are a central part of the approach, permitting to identify the catalytically relevant structures. A central aspect of the model catalyst approach is an atomic-scale characterization as a pre-requisite to understand structure-reactivity relationships on a microscopic level. In this lecture, I will introduce the key concepts of model catalysis, give a short historical overview, introduce some implementations, their limitations and benefits, as well as provide some examples.