

## **Model Catalyst Design: A Perspective at the Atomic level**

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Understanding catalysis, and in particular heterogeneous catalysis, has been based on the investigation of model systems. The enormous success of metal single crystal model surface chemistry, pioneered by physical chemists, is an outstanding example. Increasing the complexity of the models towards supported nano particles, resembling a real disperse metal catalyst, allows one to catch in the model some of the important aspects that cannot be covered by single crystals alone. One of the more important one is the support particle interface. We have developed strategies to prepare such model systems based on single crystalline oxide films which are used as supports for metal and oxide nano particles, whose geometric structure, morphology, electronic structure, as well as interaction and reaction with molecules from the gas phase may be studied at the atomic level. Using a number of examples we show how the knowledge gained may be used to design systems with predetermined properties.