

ChemE Faculty Colloquium

Single site catalysis: From atomic design to process design

by

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Rolls available from 12.40h.

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ABSTRACT

Highly active and selective catalysts are the key to a sustainable future. In this context, new catalysts need to be developed to provide energy and commodity chemicals. Hybrid materials bearing organic and inorganic motifs have been extensively discussed as playgrounds for the implementation of atomically resolved inorganic sites within a confined environment, with an exciting similarity to enzymes. Targeting the exquisite reactivity and selectivity that enzymes display requires to understand how nature does it, after which we can try to apply the same principles to designing a chemical model able to combine characteristics both from the organic and inorganic materials fields. In this talk I will explain our strategy in catalyst design. We made use of an available toolbox (MOFs, CTFs, etc) to apply these materials as much more than simply a scaffold but rather as an integral part of the catalyst itself. I will explain two different catalytic reactions (i.e. methane oxidation and hydrogen evolution reaction) to highlight the importance of catalyst design at the atomic level and its implications in catalysis.