

Workshop Summary
ALBA II - Workshop on present and future perspectives of catalysis

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Patricia Concepcion	19/07/2021
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Speaker	Date

Speaker and team: Speaker: Dr. Patricia Concepción;

Title: How to address catalyst complexity using spectroscopy

Short Abstract:

(describe the field, the grand challenge to be solved, the impact if solved; about 2000 character)

In the present presentation important aspects in the field of catalysts are discussed, such as the need of new more efficient production routes and how to face the intermittence of renewable energies. In this scenario, the design of new catalysts based on a molecular level understanding of the catalyst under fluctuating reaction conditions, the development of predictive modelling strategies and the transfer from fundamental research to innovation and application are proposed as key points. Important issues such as sample heterogeneity and the dynamic behavior of the catalyst under reaction conditions are addressed, highlighting the need of spatial resolved and temporal resolved spectroscopic tools. On the other hand, the necessity of realistic operation conditions, such as pressure and space velocity, and that of a multimodal approach combining laboratory spectroscopic tools with synchrotron studies are discussed. In this direction, subsurface oxygen species modulating the electronic properties of surface copper species are disclosed as responsible of the enhanced methane steam reforming (MSR) activity of a Cu/ZnO/Ga₂O₃ catalyst.

Describe the technique/probe to solve the grand challenge *(about 1500 characters):*

Aberration corrected transmission microscopy, NAP-XPS, XAS, operando Infrared spectroscopy, time resolved catalytic studies, transient studies

Provide supporting literature, if appropriate or necessary:

Nature Comm., 9, 2018, 574; ACS Catal., 9, (2019), 2922; Nat. Chem.5 (2013) 775; J. Am. Chem. Soc., 141 (49) (2019) 19304.