Ive Hermans

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Ive Hermans obtained a Ph.D. under the supervision of Profs. Pierre Jacobs and Jozef Peeters (2006; K.U.Leuven, Belgium). In addition to his scientific education, Ive Hermans also holds a postgraduate degree in Business Administration (K.U.Leuven, 2006). After post-doctoral research on *in situ* spectroscopy and reaction engineering with Prof. Alfons Baiker, he became assistant professor for heterogeneous catalysis (spring 2008) at ETH Zurich in Switzerland. January 2014, Prof. Hermans moved to the University of Wisconsin-Madison, holding a dual appointment in the Department of Chemistry and the Department of Chemical and Biological Engineering. His group focuses on the mechanistic understanding of catalytic technology using a variety of techniques. In 2009 he received the ExxonMobil Chemical European Science and Engineering Award, in 2014 the Emerging Researcher Award by the ACS Division of Energy and Fuels, the 2016 Postdoc Mentoring Award by the UW Postdoc Association, the 2017 Inaugural Robert Augustine award by the Organic Reaction Catalysis Society, and the 2019 Ipatieff Price by the American Chemical Society. He currently serves at the John and Dorothy Vozza Professor and is a H. I. Romnes Faculty Fellow.

"Boron-Based Materials for the Oxidative Dehydrogenation of Alkanes"

Abstract

The oxidative dehydrogenation of propane (ODHP) as a method of "on-purpose" propylene production has been broadly studied as an alternative to naphtha cracking and dehydrogenation. However, even after decades of research establishing supported vanadium oxide as the state-of-the-art catalyst for ODHP, selectivity to the olefin product remains too low to be commercially attractive because of facile over-oxidation of propylene into CO and CO_2 (CO_x). During this presentation I will bring the story of how we discovered that boron and boron containing materials (like BN, B_4C, NiB, amongst others) are highly selective catalysts for the ODHP reaction. Kinetic and spectroscopic insights will be combined to shine light on potential reaction mechanisms. FTIR, Raman, XPS, XAS and MAS NMR spectroscopy all indicate that the surface of all tested boron-containing materials becomes partially oxidized, forming an active layer of BO_xH_y species. The reactivity of this surface layer is likely influenced by the properties of the bulk material, opening new possibilities for future catalyst development.

Tuesday, April 30th

1:00 – 1:50pm

Spahr Auditorium (2 Eaton)