

INVITED ORAL PRESENTATION

Novelty and challenges in industrial catalysis

Radu Crăciun

Honorary Consul of Romania in NJ, USA

Technology Manager of Americas, BASF Corp., Chemical Catalysts, Iselin, NJ-USA, radu.craciun@basf.com

The “*verbund*” concept, where a side product from the main process becomes the feed for another process, thus minimizing waste and optimizing overall process, has been applied with success at BASF for years and helped shape the success for a worldwide company. This has led to the development of many new technologies, including catalysts. The complexity of an industrial process and the interconnections between various synthesis steps in a large plant operation requires fast and efficiently the development of new, novel, robust and unique catalysts.

Modern analytical tools help elucidating the structure and mechanism of a catalytic process, nevertheless, the experiments are tedious, require high level of knowledge and investment/cost, and ultimately, actual experimental lab and pilot testing data are needed before implementing it in a large-scale application. The topic of this presentation is to review modern, state-of-the-art” tools used for designing and testing new and novel catalysts based on copper, alumina and precious metals, employed and applied in various applications by the teams at BASF in close cooperation with HTE and customers.

The BASF’s new, novel GREEN precious metals catalyst technology platform based on the “*edgecoated*” preparation of precious metal/PM offers some unique feature and advantages such as significant reduced metal loading (up to 90%) without compromising performance, thus leading to lower cost (e. g. it is estimated a 2 mil\$ cost reduction in certain applications), reduced CO₂ emission (>200 mt/mt catalyst) vs the standard, uniformly dispersed precious metal technology.

Keywords: high throughput testing; hydrogenation; dehydration, alumina and copper catalysts, pressure drop modeling

References:

- [1] Radu Crăciun, “Structure/Activity Correlation for un-promoted and CeO₂-promoted MnO₂/SiO₂ Catalysts”, Catalysis Letters **1998**, 55, 25-31.
- [2] Radu Crăciun, J. M. Vohs and R. J. Gorte, “Method for Solid Oxide Fuel Cell Anode Preparation”, University of Pennsylvania, U.S. Patent # 6,939,637, **2005**.
- [3] Radu Crăciun, B. Nentwick, K. Hadjiivanov, and H. Knoezinger, “Structure and redox properties of MnO_x/ Yttrium stabilized zirconia catalyst & it’s used in CO and CH₄ oxidation”, Appl. Cat A: Gen. **2003**, 243, 67-79.
- [4] Radu Crăciun, M. Paul “Modern Tools in Catalysts Design for Ind. Applic. - a novel BASF-HTE synergistic cooperation effort for a sustainable future” Am. Chem. Soc. Meeting, Indianapolis, **2023**, Invited Speaker.