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Tuesday, December 17th, 2024, 7:30PM
103 Maeder Hall
86 Olden St, Princeton, NJ 08544

Please join us for happy hour (6pm) and dinner (6:45pm) prior to the seminar!

Dr. Stu Soled

Distinguished Research Associate, ExxonMobil

Issues and opportunities in Fischer-Tropsch chemistry: past and future

The increasing interest in using bio feedstocks for fuels has rekindled an interest in Fischer-Tropsch (FT) synthesis. Although FT catalysis is approaching the centennial of its discovery, and although there are close to 500,000 barrels a day of synthetic fuel produced from non-renewable feedstocks by FT worldwide every day, many issues and opportunities exist to improve this process.

In this presentation we describe the evolution of our learning on designing supported cobalt catalysts particularly ones that can overcome issues with deactivation. We report on three intrinsic modes of deactivation, including surface oxidation of cobalt crystallites, irreducible mixed metal oxide formation, and growth of cobalt crystallites during synthesis. The data clearly show that under the conditions of FT synthesis, coalescence is the primary path of agglomeration and irreversible deactivation. Nanoscale particle

homogeneity appears to play a key role in determining the degree of coalescence. We will describe techniques to monitor the deactivation effects as well as hypotheses regarding the mechanisms that cause them. We present TEM studies using a specially designed ex-situ treatment cell where catalysts could be treated in a small fixed-bed reactor in which a TEM grid support was mounted, so that the subsequently inertly transferred material could be examined in the state it acquired during FT synthesis. We describe approaches to minimize and mitigate the deactivation routes and discuss the evolution of catalyst design learnings.

Speaker Bio

Stu Soled has spent over 40 years at Exxon's Corporate Research Labs and currently holds the position of Distinguished Research Associate. His research interests lie in the synthesis, characterization and evaluation of novel catalytic materials. He has worked extensively on Fischer-Tropsch chemistry, solid acids, metal catalysis, and hydrotreating. He attended City College of New York where he received a BS degree in chemistry and following that he pursued his Ph.D in chemistry from Brown University in 1973, with an emphasis on single crystal structure determination. He then did 4 years of post-doctoral work in solid state chemistry both at Brown University and in France, focusing on the synthesis and characterization of novel oxide and sulfide materials. He is the coauthor of more than 70 publications and over 100 U.S. patents. He is credited with the discovery of two new types hydroprocessing catalysts, Nebula® and Celestia®, which since 2002 and 2017 respectively, have been loaded into more than 100 refinery process units worldwide to help produce low sulfur diesel fuels. Stu is the recipient of the New York Catalysis Society Excellence in Catalysis Award, the North American Catalysis Society Frank Ciapetta Lectureship Award, the ACS Heroes in Chemistry Award, the Herman Pines Award in Catalysis, the Distinguished Researcher Award in Petroleum Chemistry from the Division of Energy and Fuels of the American Chemical Society, the NACS service award, and in 2014 he became a member of the National Academy of Engineering in recognition of his contribution in discoveries in hydroprocessing catalysts.

Schedule	
Social Hour	6:00 PM
Dinner	6:45 PM
Presentation	7:30 PM

There will be no student speaker this meeting.

Meeting Fees	
Professional Members	$40
Non-members	$50
Students	$25 (Student Members = $10)
Retired/Post-Doc/Unemp.	$40 (Members = $30)

Deadline for reservations is **5:00PM Friday, December 13th, 2024**

Please RSVP online using the online form.

To renew your membership, please visit this link.