

5th Annual AIChE Midwest Regional Conference

January 31st – February 1st, 2013

Organized by the Chicago Local Section of the AIChE

Hosted by the Illinois Institute of Technology, Chicago, IL

Session Fr3A: 3:00pm -4:30pm, Friday February 1, 2013 (Armour Dining)

Emerging Technologies in the Oil and Gas Industry

Session Organizer: Rajeswar Gattupalli, UOP LLC, A Honeywell Company

Session Chair: Rajeswar Gattupalli and Reza Mostofi, UOP LLC, A Honeywell Company

3:00pm Hydrodynamics of FCC Riser using Advanced Simulation Tools

Reza Mostofi, and Lev Davydov, UOP LLC, A Honeywell Company

“Non-ideal” riser hydrodynamics can lead to “under-conversion” of feed in the core of the riser and overcracking of products in the annulus of the riser. Computational Fluid Dynamics (CFD) is used to understand and improve the flow behavior of FCC risers using different approaches. One method is the two-fluid model where the particles are treated as fluid and can be applied to riser’s flow. Another approach that can be used to model such systems is based on the Lagrangian formulation. These two CFD approaches were successfully validated by cold flow results and applied to several commercial FCC units. In this presentation several examples of these methods for different flow rates and/or geometries will be discussed.

3:30pm Creating Opportunities from Challenges: Maximizing Propylene Yields from Your FCC,

Jeff Knight, Robert Mehlberg, UOP LLC, A Honeywell Company

Fluid Catalytic Cracking (FCC) technology has been the refining industry’s conversion mainstay for gasoline production over the last 70 years. Over the decades, it has proven to be the cheapest form of carbon rejection in the conversion of heavy gasoil feedstocks into lighter, more valuable fuel products. However, emphasis on energy independence and climate change is leading to significant changes in the motor gasoline market as ethanol addition and vehicle efficiency reduce the demand for petroleum-derived blend components, thus creating a challenge for FCC-based refineries. At the same time, petrochemical producers are looking for propylene yields exceeding 20 wt% and BTX yields approaching 10 wt% of gas oil feed. This demand for petrochemicals offers a potential answer to this challenge by re-purposing the FCC unit as a means to increase propylene yields. This presentation will summarize UOP’s response to customer requirements for a high propylene-yielding FCC process and through case studies. It will also highlight key features of and learning’s from the development of UOP’s 2-stage RxPro FCC process.

4:00pm Offshore Gas Treatment Technology for Natural Gas

Saadet Ulas Acikgoz, Shain Doong, Pengfei Chen and Lubo Zhou UOP LLC, A Honeywell Company

Offshore liquefaction of natural gas is expected to be the next technological breakthrough for capitalizing stranded natural gas resources. There are several technology options that can be used for acid gas removal or pretreatment of FLNG (Floating Liquefied Natural Gas) plants. The traditional amine absorption processes have been widely used for the treatment of feed gas for onshore LNG plants. Due to limited space available on the offshore facility, the gas treatment units on FLNG plants have to be designed with smaller weight and footprint. A hybrid system is a combination of membranes for bulk CO₂ removal and amine units as polishing systems. Membranes have been proven in multiple offshore applications and suitable for offshore environment due to their compactness, minimal weight, footprint and insensitivity to sea motion. These hybrid systems can reduce the size and weight of the total pretreatment unit, minimize the effect of sea motion on the amine column performance and offer a cost effective solution.