

# Reaction Pathways Involving Methoxy in Methanol to Gasoline/Olefins

## Frontiers in Catalysis Science and Engineering Seminar Series

### Presented by...

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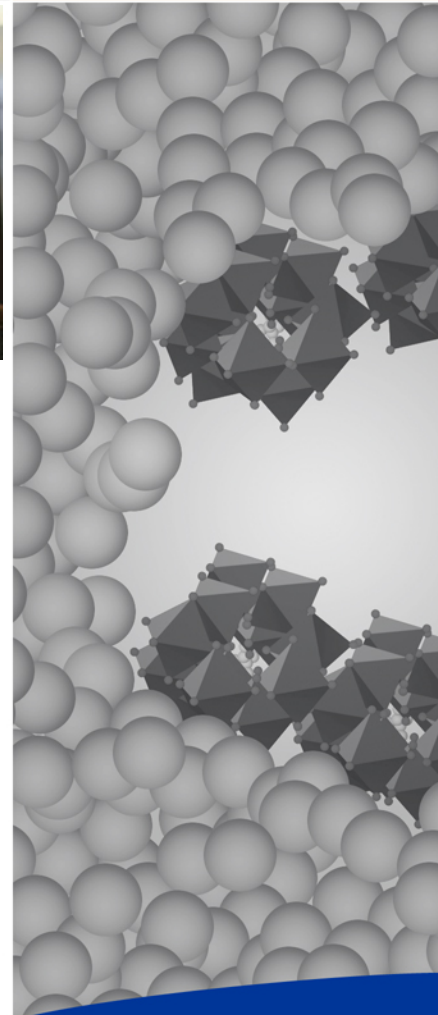
### Abstract

New sources of fossil fuels have stimulated a search for routes to transportation fuels based on synthesis gas, that is, through the synthesis gas production of methanol. This has drawn renewed attention to the methanol-to-gasoline (-olefins), MTG (MTO) processes, most of which are based on H-ZSM-5 zeolites. The accepted mechanism is complex and involves interactions between the inorganic zeolite and organic molecules in the pores, the so called “hydrocarbon pool” mechanism. Within the hydrocarbon pool mechanism, there are two steady-state catalytic cycles involving methylation of olefins and methylation of aromatics. Examining methylation reactions, either experimentally or theoretically, in the presence of the steady-state hydrocarbon pool is difficult, but because of the stability of the methoxy species, it can be formed and studied in the absence of the hydrocarbon pool. Reaction pathways involving methylation of CO and dimethyl ether by adsorbed methoxy to form possible initial C–C bond species [1,2] and reactions steps of olefins [3] and aromatics methylation [4] will be reviewed.

The role of methoxy in initial coke formation has been studied using a back-mixed reactor (CSTR) [5]. Catalyst deactivation under homogeneous gas phase (CSTR) show that in the early stages of the reaction the zeolite deactivates via blocking of individual Brønsted acid sites and not by coke induced blocking of pores. During the initial phase of deactivation, the rate is directly proportional to the methanol partial pressure and is caused by oxygen-containing surface species.

Hosted by: Chuck Peden

Admin: Brooke Lanigan



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1:30 pm