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**Wednesday, October 16th, 2024, 6:00PM**  
**225 Fenster Hall**  
**323 Dr. Martin Luther King Blvd,**  
**Newark, NJ, 07103**

**Dr. Qiyuan Wu**



*Lead Scientist, Air Company*

## **Spectroscopic insight into carbon speciation and removal on a Cu/BEA catalyst during renewable high-octane hydrocarbon synthesis**

Active site occlusion by carbon species, often referred to as coke, is a common deactivation mechanism for heterogeneous catalysts. While it is known that transition metals can lower the temperature required for oxidative coke removal, the roles of ionic species and metal nanoparticles in coke removal are not well understood. This work aims to differentiate how ionic and nanoparticle Cu sites catalyze oxidative regeneration of a coked beta (BEA) zeolite catalyst which is used for high-octane gasoline synthesis from methanol or DME. This was accomplished by synthesizing catalysts containing exclusively CuOx nanoparticles (NPs) or Cu<sup>2+</sup> ions supported on BEA, physically mixing Cu/BEA with a coked BEA catalyst, and monitoring coke removal using in situ spectroscopy. Our results point to an improved combustion activity for CuOx NPs relative to Cu<sup>2+</sup> ions, especially in the combustion of graphitic-type coke species. This improved understanding of coke combustion in transition metal containing catalysts informs strategies to improve catalyst regeneration, thereby increasing operational lifetimes.

## Speaker Bio

Dr. Qiyuan Wu obtained his Ph.D. degree from Stony Brook University. Dr. Wu is currently a Lead Scientist in the Research, Development, and Engineering Department at Air Company. Prior to joining Air Company, Qiyuan worked at both the Brookhaven National Laboratory and the National Renewable Energy Laboratory. His research has been focused on material development for various applications including catalysis for fuel and chemical production from renewable resource such as carbon dioxide and biomass. Qiyuan has significant experience on utilizing combination of *in situ* characterization techniques to understand the evolution of materials under application conditions.

<u>Schedule</u>		<u>Meeting Fees</u>	
<b>Social Hour</b>	6:00 PM	Professional Members	\$40
<b>Dinner</b>	6:45 PM	Non-members	\$50
<b>Presentation</b>	7:30 PM	Students	\$25 (Student Members = \$10)
<i>There will be no student speaker this meeting.</i>		Retired/Post-Doc/Unemp.	\$40 (Members = \$30)
		<b>Annual Membership Dues</b>	<b>\$35 (Students = \$15)</b>

**Deadline for reservations is 5:00PM Saturday, October 12th, 2024**

Please RSVP online using the [online form](#).  
To renew your membership, please visit this [link](#).