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**Wednesday, November 15th, 2023, 6PM EST**

**Watt Hotel Rahway**

**1403 Irving St., Rahway, NJ 07065**

**Prof. Xianqin Wang**



*Chemical and Materials Engineering Department  
New Jersey Institute of Technology*

### **A New Member to Catalyst Family: Polynitrogen**

Polynitrogen (PN) species and compounds are chain-like arrangements of nitrogen atoms that are building blocks for three-dimensional crystalline structures. Pure PN solids are particularly attractive because of their high energy density and decomposition to N<sub>2</sub> that is non-toxic and friendly to the environment. Motivations of searching for these PN compounds have been for their potential use as highly energetic materials. Since the first synthesis of the azide anion N<sub>3</sub><sup>-</sup> in 1890, it has been the only known stable homoatomic nitrogen species for more than 100 years besides molecular N<sub>2</sub>. Although theoretical studies have predicted the existence of other polynitrogen (PN) compounds and intense efforts have been made to synthesize them, it was not until the last decade that N<sub>5</sub><sup>+</sup> was synthesized for the first time. This led to extensive research activity resulting in the synthesis or gas phase detection of several other species, such as N<sub>5</sub><sup>-</sup>, N<sub>3</sub> and N<sub>4</sub>. Recently, a single, zigzag N<sub>8</sub> chain of nitrogen atoms was theoretically shown to be stable inside carbon nanotubes and between sheets of graphene and experimentally synthesized under ambient conditions. Macroscopic synthesis of PN compounds however remains difficult. Our initial success

in the synthesis of PN (N8) stabilized on a carbon nanotube substrate using electrochemical approaches with and without UV-irradiation provides us with an opportunity to investigate its catalytic properties for various reactions. Our preliminary work showed that PN material is a very promising catalyst for many reactions. In this talk, PN synthesis and its applications for fuel cells and selective hydrogenation reactions will be covered, and the insights on PN as a new member of catalysts will be discussed.

## Speaker Bio

Dr. Xianqin Wang is currently a professor at the New Jersey Institute of Technology (NJIT). She obtained her Ph.D. in Chemical Engineering from Virginia Tech. She worked as a research associator at the Brookhaven National Lab and as a scientist at the Pacific Northwest National Lab (PNNL) for a couple of years before she joined NJIT in 2007. Her research efforts focus on two major categories: developing novel catalytic materials for sustainable energy production and environmental protection, and investigating the structure and reactivity of catalytic systems under operation conditions including high pressure and temperature. She has published over 100 refereed papers and book chapters in both national and international journals and presented over ~150 conference and seminar talks. Xianqin has been a tireless contributor to our scientific community including catalysis society. Since 2010, she has organized and chaired 27 symposia in the ACS national meetings. She served a co-program-chair of the ENFL program in 2015 and the program chair for the ENFL division in 2016. She was Guest Editor for two special issues based on ACS ENFL symposia she organized and chaired and is serving on editorial board for Energy Science & Engineering, Nature Scientific Report, and Engineered Science journals.

<u>Schedule</u>		<u>Meeting Fees</u>	
<b>Social Hour (Cash Bar)</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)
		Retired/Post-Doc/Unemp.	\$40 (Members = \$30)
		<b>Annual Membership Dues</b>	<b>\$35 (Students = \$15)</b>

**Deadline for reservations is 12:00PM Tuesday, November 14<sup>th</sup>, 2023**

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