DEPARTMENT OF CHEMISTRY AND ENVIRONMENTAL SCIENCE SEMINAR SERIES **SPRING 2022**

DATE: WEDNESDAY, FEBRUARY 16, 2022

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Meeting access code: 26221186331 Password: CES

TIME: 1:00PM-2:20PM

GUEST SPEAKER

Dr. Anindita (Dia) Das Department of Chemistry Southern Methodist University Dallas, Tx

TOPIC

Tuning Properties of Group 11 Metal Clusters through Ligand Shell Design

ABSTRACT

With the advent of nanotechnology in the mid-1980s, metal nanoparticles have attracted tremendous interest due to their unique properties which make them suitable for diverse applications in electronics, catalysis, optics, and nanomedicine. However, the inherent polydispersity of conventional metal nanoparticles has precluded an atomic-level understanding of their structure-property relationships. This, in turn, has greatly hampered the complete realization of their target functional properties in real-world applications. Hence, recent research efforts in the field have focused on developing highly stable, atomically precise metal clusters (primarily, Au), which allow accurate structure-property correlations. This talk will highlight the role of ligands in dictating the observed physicochemical properties of such structurally wellresolved Au clusters. Specifically, we will focus on a series of Au clusters, the structures of which feature a centered-icosahedral Au₁₃ 'superatom' kernel. Using clusters with this common structural motif, we will demonstrate the effects of different protecting ligand shells on the cluster's observed properties, including its stability and reactivity. Additionally, we will demonstrate how physicochemical properties of gold clusters can be tailored by using mixed ligands for desired applications.

BIO

Anindita (Dia) Das obtained her Ph.D. with Prof. Rongchao Jin at Carnegie Mellon University, where her research focused on the synthesis and single-crystal growth of atomically precise gold nanoparticles to gain in-depth understanding of catalytic mechanisms. Prior to this, she earned B.Sc. and M.Sc. degrees at Osmania University, India and the University of Pune, India respectively. Following her PhD., Dia carried out postdoctoral research with Prof. Chad Mirkin at Northwestern University, where her work centered on the development of spherical nucleic acids based on atomically precise gold nanoclusters for applications in colloidal crystal engineering. Dia started her independent lab in the Chemistry Department at Southern Methodist University in Fall 2020.

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