TRENT UNIVERSITY

CHEMISTRY/PHYSICS SEMINAR SERIES

Dr. Lucia Lee

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Wednesday, February 7, 2024
11:00 a.m. to 11:50 a.m. in ENW 115

Applications of Pnictogen, Chalcogen and Halogen Bonds

ABSTRACT

Supramolecular chemistry relies on non-covalent interactions between small molecular building units to self-assemble into larger and more complex structures.1 Examples of these interactions include hydrogen bonding, electrostatic interactions, π-π stacking, cation and anion-π interactions, van der Waals forces and σ-hole interactions.1 The latter is formed between an electrophilic region (σ-hole) in a covalent bonded heavy main group atom and a Lewis base.2 Subsets of these interactions include pnictogen bonds (group 15), chalcogen bonds (group 16) and halogen bonds (group 17).3 This presentation focuses on the fundamental studies of chalcogen bonds formed from 1,2,5-chalcogenadiazoles.4 Methods to enhance the strength of the Se—N chalcogen bonds through N-substitution chemistry will be extensively discussed. Additionally, the transmembrane anion transporting activity of pnictogen, chalcogen and halogen bonds formed by a series of perfluorophenyl compounds will be discussed. In these studies, it was found that chalcogen bonds from a tellurium-centred species were strong and more stable than those in antimony and iodine analogues.

BIOGRAPHY – LUCIA LEE

Lucia is an Assistant Professor in the Department of Chemistry at Queen's University. Her research group focuses on developing small supramolecular building blocks containing heavy main-group elements and harnessing ability to form sigma-hole interactions for various applications in materials chemistry.

Lucia received her B.Sc. in 2011 from McMaster University (Hamilton, Canada), where she continued as a doctoral student to study organochalcogen supramolecular building blocks under the mentorship of Prof. I. Vargas-Baca. Upon completion of her Ph.D. in 2017, she joined the Matile group at the University of Geneva (Geneva, Switzerland) as a postdoctoral fellow to pursue studies on transmembrane anion transport using main-group supramolecular interactions. In 2019, she joined the Klajn and Bar-Shir groups at the Weizmann Institute of Science (Rehovot, Israel) as a Zuckerman STEM Leadership Postdoctoral Fellow. Her research work involved developing stimuli-responsive nanomaterials and MRI imaging probes.