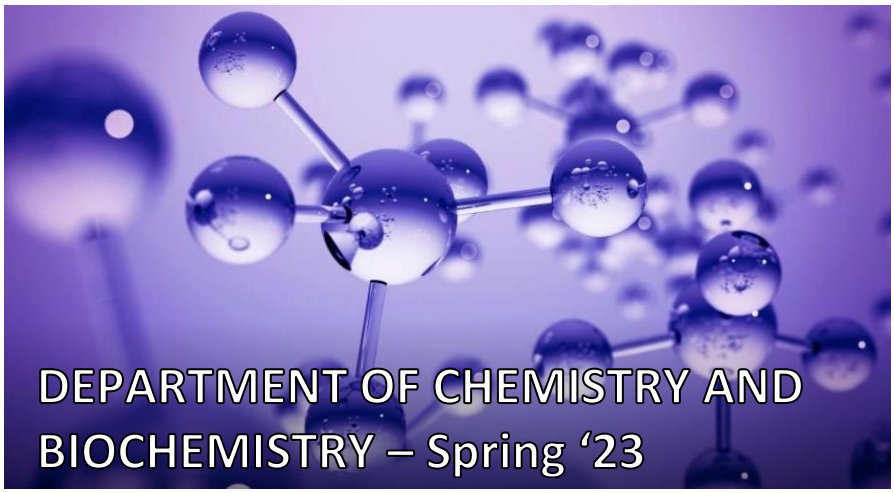
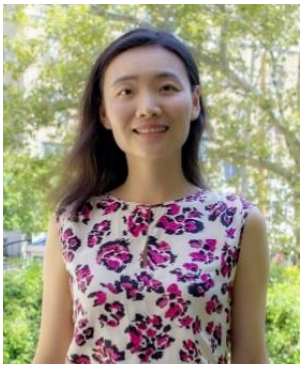


THE SALZBERG CHEMISTRY SEMINAR SERIES

The City College of New York

CREST IDEALS PHASE II

Monday, May 1, 2023 @ 12:00 noon – MR1027



Metal-free carbons as antibacterial materials: exploring their combined effects of surface chemistry and porosity

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Abstract: Bacterial contamination in drinking water systems presents a significant threat to public health. This research aim is to study the antibacterial activity of heteroatom-doped porous carbons. A high surface-to-volume ratio and unique features such as photoactivity are their advantages. Porous carbons with antibacterial activity can be potentially applied to the existing drinking water treatment system and reduce disinfection process cost. The talk will first focus on the antibacterial activity of graphitic carbon nitride/sulfur-doped carbon (GCN-CS) composite and sulfur-doped carbon (CS) against the Escherichia coli (*E. coli* K12, 2 x 10^3 CFU/ml) bacteria. In this work, the viability of *E. coli*, assessing the antibacterial activity of a material, was examined through traditional plate counting. The viability of *E. coli* after 1h of contact with GCN-CS and CS under the dark was 65% and 0%, respectively. The viability of *E. coli* after 1h of contact with GCN-CS and GCN under visible light was 20% and 0%, respectively. After 3h of contact with GCN-CS under visible light, *E. coli* showed a viability of 0%. The high antibacterial activity of sulfur-doped carbon indicated that the high surface area (395 m^2/g), low surface pH (3.16), and sulfur species, especially thiophenic sulfur (2.85 at. %), played an important role in treating *E. coli*. The higher antibacterial activity of GCN-CS under visible light than dark can be attributed to its bandgap (2.66 eV), which is measured by impedance spectroscopy. The second part of the talk will focus solely on the sulfur-containing carbons and show the relationship between their antibacterial activity and surface chemistry/porous structure.

Biography: Dr. Wanlu Li is an Assistant Professor of Chemistry at Saint Peter's University. She earned her doctoral degree in Chemistry from the Graduate Center, City University of New York. Her Ph.D. advisor is Dr. Teresa Bandosz at City College of New York. She joined Saint Peter's University as an Assistant Professor in 2019. Currently, she works with undergraduate students to explore porous carbon materials development and their applications in magnetic adsorption of pharmaceuticals, antibacterial materials, and supercapacitance. Dr. Li is a principal investigator on NSF project-Metal-free heteroatom-doped carbons as efficient antibacterial materials. It will open a new perspective on metal-free materials in antibacterial studies. At Saint Peter's University, Dr. Li serves as a member of the Sustainability Council since 2020 and the honors program committee since 2021. She is also the advisor to Gamma Sigma Epsilon – the honor society of chemistry students, Saint Peter's Chapter since 2022.

Join Meeting in-person at MR-1027

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