

Sutapa Bhattacharya, PhD Candidate

Department of Chemistry, Missouri S&T



Monday, 21 October 2024

4:00 pm in 303 Schrenk Hall

**Exploring new poly-anion based materials for Li – ion
battery cathodes**

Abstract: The increasing application of lithium-ion batteries (LIBs) as energy storage for stationary and mobile devices has led to enormous research efforts in various directions. As cathode material has major effect on the working voltage and specific capacity of a battery, a large amount of research is devoted in identifying and developing different types of cathode materials for LIBs. Among them, polyatomic anion-based cathode (commonly known as polyanion cathode) materials have received a lot of attention ever since the introduction of olivine (LiFePO_4) by Goodenough due to two main reasons: i) their electrochemical stability during cycling because of the strong covalent bond between oxygen and the central atom of the polyanion; ii) The ability to tune the redox potential of the transition metal couple by using different polyanion with central atom of different electronegativity. There has been a plethora of inventory of polyanion cathodes based on various anionic moieties such as phosphates, silicates, borates, fluoro-phosphates, pyrophosphates etc. and containing various transition metals. However, there are some unexplored polyanions such as phosphite, selenite that can offer interesting voltage tunability due to their intermediate electronegativity. This presentation will mainly focus on exploration of new selenite-based polyanion cathodes as well as exploration of multi-electron redox process in comparatively less explored transition metal such as molybdenum with phosphate as a polyanion.