National Institute of Technology Rourkela

Registration Seminar

Seminar Title	: SYNTHESIS OF TRANSITION METAL-CHALCOGENIDES NPs AS ANODE MATERIAL FOR Li-ION BATTERY AND RELATED APPLICATIONS
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Venue	: Chemistry Seminar Room
Date and Time	: 01 Aug 2024 (11:00 AM)
Abstract	: The superb characteristics and wide range of applications of transition-metal chalcogenides in optical devices, electrical, catalytic, and biological imaging have sparked a great deal of interest in their synthesis and characterization in recent years. A range of transition metal chalcogenides have been created recently that exhibit exceptional performance and long-term stability as an effective electrocatalyst towards HER in acidic media. Several transition metal chalcogenides, including FeS_2, CoS_2, CoSe, $CoSe_2$, $NiTe_2$, $CoTe_2$, and CoTe, have been identified as effective electrocatalysts for HER in both acidic and alkaline media based on a review of the literature. In this regard, choice of precursor complex with proper metal ligand combination has been one of the main challenges to get definite and pure nanomaterial phases. This prompted us to identify transition metal clusters as a potentially ideal source of single-source precursor which are stable under ambient conditions and have the required transition metal-main group metal bond pre-organized in a single molecule. To our knowledge, literatures involving the use of single source precursor for the preparation of TM chalcogenides are less known, while for some higher congeners it is not yet known. Therefore, the aspect of the present report provides the design of cluster molecules, and to explore a facile method using these stable clusters as single source precursor for the preparation of several binary and ternary transition metal chalcogenides nanoparticles with characterization and property study. In addition, efforts will be given to modify, functionalize or prepare different composites of the nanomaterials for different related application A further aspect of the report provides the investigation for the use of transition metal chalcogenides nanoparticles as electrode material in lithium/sodium ion batteries, electrocatalytic hydrogen evolution reaction, gas sensing devices etc.