Tata Institute of Fundamental Research
Survey No. 36/P, Gopanpally Village, Serilingampally, Ranga Reddy Dist., Hyderabad – 500 046

Seminar

Towards Advanced Rechargeable Metal-Air Battery Systems Using Electrode and Electrolyte Engineering and Biomolecules based Electrodics

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According to Intergovernmental Panel on Climate Change (IPCC) 2022 report, industries and transportation are the two major contributors to the total greenhouse gas (particularly CO_2) emission among various sectors.[1] Towards an environment-friendly and sustainable economy, metal-air battery (MAB) technology-based energy systems emerge as potential pathways for the future energy sector.[2,3] However, certain bottlenecks in the advancement of the MABs such as the high cost of electrocatalysts, premature battery failure, self-discharge etc. need to be addressed. In a series of studies conducted here, issues related to the two most budding MAB technologies (Zinc-O_2 and Li-O_2) are addressed by different electrode and electrolyte engineering approaches. These studies also show the potential of biomolecules as electrocatalysts for different reactions such as oxygen reduction and hydrogen evolution reactions. The results and observations made from these studies will be discussed during the presentation.

References:

1. https://www.ipcc.ch/report/sixth-assessment-report-working-group-ii/
2. Advanced zinc-air batteries based on high-performance hybrid electrocatalysts. Nat Commun 4, 1805 (2013).
3. Batteries and fuel cells for emerging electric vehicle markets. Nat Energy 3, 279–289 (2018).

Thursday, Jan 12th 2023

3:00 PM (Tea/Coffee at 2:45 PM)

Auditorium, TIFR-H