
Speaker/affiliation: Prof. Ankur Gupta, University of Colorado Boulder, USA.

Tentative topic of the invited talk

Electrolyte transport in porous materials

Abstract of the invited talk

Electrochemical capacitors hold promise for applications requiring high power density. However, our mathematical understanding of electrolyte transport within these devices remains limited. Existing models often make inaccurate predictions by neglecting confinement effects and the interaction between the electrical double layer and redox reactions. We address these shortcomings by developing a comprehensive theoretical framework to predict double-layer charging in complex networks of long pores, within the (linear) Debye-Hückel limit. This framework enables the simulation of electrolyte transport in thousands of pores within minutes, bridging a critical knowledge gap and paving the way for the rational design of next-generation electrochemical capacitors.

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