

**Symposium Title:**

Porous Electrodes for Desalination and Environmental Applications

**Keywords:**

Transport and salt storage in porous electrodes, desalination of water, environmental technology, combined water and ion transport, ion storage and Faradaic processes in carbon micropores, intercalation reactions, porous electrode theory and structure, fluidized bed electrodes, carbon nanotube membranes

**Preliminary Symposium Description:**

Electrochemical technologies based on porous electrodes for environmental applications (mainly in water) have long been employed to provide innovative solutions to important environmental challenges. Porous electrodes use capacitive processes (electrical double layer formation) to store salt, or Faradaic (e.g., intercalation reactions) or pseudocapacitive reactions, where ions are stored at solid/electrolyte interfaces or within solids. Examples include pollutant separation and transformation, capacitive deionization of brackish water and seawater, and energy generation from environmental gradients in salinity or CO<sub>2</sub>. Recent advances in our understanding of species transport processes and the design of porous electrodes (e.g., the use of hierarchical structures fluidized bed electrodes, and the impact of immobile chemical charge) have significantly expanded our ability to improve the performance of existing porous electrode technologies and develop new ones. Convection, diffusion, and dispersion processes enable continuous production of treated solutions in these systems, and, consequently, fundamental understanding of porous-media flow and transport is necessary to enhance device performance with minimal pumping requirements. Further, carbon nanotube membranes for water treatment further enhance the potential of carbon-based porous electrodes.

In this symposium, we invite scientists to share their latest results of innovative processes, cell design, in-situ diagnostics, novel materials and enhanced theoretical understanding in the field of porous (capacitive and/or Faradaic) electrodes for environmental applications.

**Symposium Organizers/Chairs:**

Kyle C. Smith (University of Illinois at Urbana Champaign, USA) (chair)

Slawomir Porada (University of Twente, The Netherlands) (co-chair)

Matthew E. Suss (Technion, Israel) (co-chair)

P. Maarten Biesheuvel (Wetsus, The Netherlands) (co-chair)