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Characterization of desalination performance of CDI electrode materials using extended electroimpedance spectroscopy CARLOS RIOS PEREZ, Northeastern University, ELLEN WILKES, The University of Texas at Austin, CARLOS HIDROVO, Northeastern University — A comprehensive characterization of porous materials developed for capacitive deionization (CDI) electrodes is very important for the future of this desalination technology. Traditional methods assess the adsorption performance of the electrodes using gas adsorption techniques and electrochemical tests. However, these results fail at comparing quantitatively the performance of different electrode materials. This presentation proposes using a combination of extended electroimpedance spectroscopy (EIS) tests and BET analysis to appraise the amount of salt adsorbed in a flow-by CDI system. The extended EIS experiments were analyzed using an equivalent circuit with three characteristic tiers that represent the dominant ionic migration processes with different time-scales: electro adsorption of ions in the micropores, migration of ion from bulk solution through macropores, adsorption of ions from the bulk solution. The results obtained show a very good agreement between characterization and desalination performance experiments for three commercial electrodes with different structure topology.

Carlos Rios Perez
Northeastern University

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