

# An overview of Nano engineered materials for electrochemical systems applied to continuous water purification

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In this presentation, we cover different Nano engineered materials for electrochemical processes emerging for application in water purification and desalination. There is a well established technology for water desalination, such as Reverse osmosis (RO), but is energy intensive, and strains the so-called water-energy-food nexus. However, RO can be improved to purify the water, and another electrochemical process called continuous electrodeionization (CEDI) is used to further upgrade the water's quality. We present several materials merger of CEDI that may possibly result in lower energy requirements and high quality for cleaning water. CEDI technology explores materials for different components of the electrochemical cell, some that will be considered are: 1) Nano architected materials for electrodes (anodes and cathodes), and 2) membranes for ionic transport and selectivity.

## Biography

Homero Castaneda-Lopez is the Associate Professor and Director at the National Corrosion and Materials Reliability Center within Texas A&M University. He received his bachelors in chemical metallurgical engineering and his masters in materials science from the National Autonomous University of Mexico in 1994 and 1997 respectively. He then got his Ph.D. in materials science and engineering from Penn State University in 2001. Dr. Castaneda has 15 years of experience using electrochemical and nondestructive techniques to monitor interfacial phenomena in materials and theoretical modeling of corrosion processes for different industries. He has been the PI for multiple projects on corrosion science and engineering for DOE, DOD, DOT and several companies. Before joining TAMU, he worked for five years at The University of Akron (2011 to 2015) as an assistant professor and before that at Battelle Memorial Institute as a senior scientist (2006-2010) in the Advanced Materials and Pipelines Center in Columbus, Ohio. Before Battelle, he was the Technical Director of the Corrosion, Materials and Pipelines in the Mexican Petroleum Institute for five years. He has authored and co-authored over 70 peer-reviewed papers in the areas of corrosion science and engineering, coatings degradation and reliability, materials characterization and electrochemical impedance spectroscopy. He has nine patents and copyrights. For this slate he adds a unique mixture of corrosion knowledge in offshore or similar settings including the standards and regulations pervasive in these fields.