

1. NAME

Sanjay Tewari

2. CONTACT INFORMATION

3. ADVISOR INFORMATION

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4. RESEARCH DESCRIPTION

Salinity is a major determinant of where and how the water resources are used and also natural salt pollution is severely constraining the beneficial use of large amounts of water. Estimated 2.7 billion acre-feet of brackish groundwater is there in Texas. In our neighborhood, natural salt pollution severely constrains the water supply capabilities of the Brazos River and other rivers. Heavy metals in drinking water, groundwater, and surface water have been of a great concern. Carbon Aerogels (CA) in Capacitive Deionization Technology (CDT) have been used successfully by various scholars in water remediation, purification and in desalination of brackish water. It uses a very low voltage (1-2 volts) across electrodes and thus could be the solution for desalination water treatment technology, which requires relatively high energy use.

This study focuses on desorption of adsorbed ions and regeneration of CA. Once exhausted, CA electrodes have to be replaced and they being expensive, the cost of treatment increases. Under this study various experiments are being conducted to explore the effect of flow velocity of water over CA electrodes, change of polarity of electrodes, shorting of electrodes, use of hot water and use of ultra sound waves on regeneration of CA. The most optimal combination will be used for remaining experiments which will test the effect of thickness of CA, its pore size, size of adsorbed ions and their charge on desorption and ultimately regeneration of CA. Data collected during these tests will be used for modeling regeneration behavior of CA. Use of HSDM model for kinetics of removal of ions and Langmuir model for describing the equilibrium is proposed.

Ultimately results from this study could be implemented in designing a large scale desalination and water purification facility using CDT technology and CA as electrodes. Successful completion of this project will raise the level of interest across the state and elsewhere in the development of brackish groundwater as a source of supply for desalination.

5. ACADEMIC QUALIFICATIONS

6. PROPOSED USE OF FUNDS

Funds from this scholarship will be used towards paying tuition and fee for fall semester and continuing research as this research is lab experiment extensive and it requires various consumable supplies occasionally. In addition to that I could use these funds towards future travel expenses for national conferences and meetings such as AWWA (American Water Works Association) or ACS (American Chemical Society).

7. INTENDED CAREER PATH

My research interests are remediation of contaminated sites, contaminant transport through water, low cost adsorbents & innovative treatment systems, active/inert membrane filtration and industrial wastewater treatment. During my time at Texas A&M University I have also been active part of Center for Teaching Excellence and its Graduate Teaching Academy, of which I am a Fellow. Teaching is my passion and I have been recently honored as Outstanding Graduate Teaching Assistant by Dr. David V. Rosowsky, Professor and Head of the Zachry Department of Civil Engineering. My immediate goal is to defend my Ph.D. in academic year 2009-10 and find a job where I can combine my research interests and teaching passion. After gaining some work experience as a post-doctoral fellow at national laboratory or university, I hope to teach and do further research in low cost & innovative water treatment systems and desalination. I believe research should be taken from lab to class to field. If a research cannot be applied towards the betterment of the society it has no significance and that's why I wish to collaborate with water resources/environmental consulting industries and look for better solutions in desalination and water quality. My long term goal is to become a leader in environmental engineering to develop new and efficient technology to purify and preserve water resources around the world for coming generations.