

Three-Dimensional Mesoscale Conducting Networks For Clean Water and Energy Generation

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This talk presents my group work in the last several years in developing three-dimensional (3D) mesoscale conducting networks for water-related technology. In the first example, we introduce conducting carbon nanotubes and nanowires into 3D scaffolds including textile and sponge to produce conducting filters with macroscale pore size for fast filtration of water. We utilize electroporation mechanism to disinfect efficiently all types of pathogen in water with minimum energy consumption. In the second example, we utilize these conducting 3D mesoscale networks for microbial fuel cells and batteries with significant improvement of energy efficiency. In the third example, I will show how we develop battery materials for extracting energy out of salinity difference and for water desalination.