



Processing of Nanomaterials Using Supercritical Fluids

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Abstract

Due to the environmental impact and reduced availability of fossil fuels, there is a great need for materials and devices that harvest/convert and store energy from sustainable/renewable sources. Fuel cells and supercapacitors are important devices for these applications. Furthermore, it is highly desired that such materials/devices be prepared by environmental benign processes. Supercritical fluids (SCFs) are unique solvents with tunable properties that have been widely exploited in extraction. They exhibit a range of unique properties that greatly facilitate materials synthesis and processing at nanoscale. In this talk I will mainly discuss our work on highly efficient nanostructure electrode using supercritical fluid deposition (SFD). Thus nanoporous carbon nanotubes (CNTs) buckypaper were fabricated as the substrate, and active materials were deposited by SFD using carbon dioxide as the solvent. Depending on the active materials deposited and their morphology, which is affected by the deposition conditions, the fabricated nanostructured materials can be used for proton exchange membrane fuel cell (PEMFC) showing ultra-high platinum utilization, or high performance supercapacitors.

Bio:

Dr. Changchun Zeng is currently an Assistant Professor of Industrial and Manufacturing Engineering of FAMU-FSU College of Engineering, and High Performance Materials Institute of Florida State University. Dr. Zeng's main research interests are synthesis and processing of materials using supercritical fluids, and polymer composites and nanocomposites. He received his PhD in Chemical Engineering from The Ohio State University in 2004. Prior to join FSU, he worked as Senior Research Engineer at Hexcel Corporation, a major producer of carbon fiber and aerospace composite materials.