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Nanomaterials for High Performance Supercapacitor

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For the steady supply of renewable energy such as solar energy and wind energy, energy storage and distribution system is necessary. To establish an energy storage system, large capacity supercapacitors together with secondary batteries are essential. Supercapacitors has been developed for the last 20 years, however, intensive research have been focused last 5 years. Numerous researchers are trying to develop high performance supercapacitor electrode materials. Graphene was employed to use its excellent electrical conductivity and large surface area. As the EDLC type supercapacitors showed limitations in energy density, materials with psedudocapacitance such as metal sulfide or oxide have been investigated for supercapacitor electrodes. Composites of graphene-based metal sulfides (or oxides) have been synthesized for improving the supercapacitor performance. Recently, three dimensional electrode structure has been getting tremendous attention as it provide a large surface area and large pores that enables electrolytes and charges penetrates freely. In this study, we will introduce the new electrode materials and their fabrications to supercapacitor devices.

Biography:

Jae-Jin Shim received his B.S. in Chemical Engineering from Seoul National University in 1980, M.S. in Chemical Engineering from Korea Advanced Institute of Science and Technology (KAIST) in 1982, and Ph.D. in Chemical Engineering from the University of Texas at Austin in 1990. He is a professor in the School of Chemical Engineering at Yeungnam University, Korea. He served as the President of Korean Society of Clean Technology (KSCT) and the editor of JKSCT and KJChE. His current research focuses on graphene-based nano materials for energy storage (supercapacitor), sensor, and photocatalysis using clean solvents (supercritical fluids, ionic liquids, and water).