

## Nanomaterials for Efficient Energy Storage and Catalysis

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For the steady supply of renewable energy such as solar energy and wind energy, energy storage system is necessary. To establish an energy storage system, supercapacitors and batteries are necessary. Numerous researchers are trying to develop high performance supercapacitor electrode materials. Since EDLC-type supercapacitors carry limitations in the energy density, to improve the capacitance, nanomaterials with pseudocapacitive nature such as metal sulfide or oxide have been investigated. Composites of graphene-based metal sulfides (or oxides) have been synthesized for efficient charge storage. Recently, electrodes with three-dimensional morphology have got tremendous attention as it provide a large surface area and large pores that enables electrolytes and charges penetrates freely.

Also catalysts and photocatalysts based on nanomaterials have been developed, especially graphene-based materials are getting attention. Nanocatalysts for pollutant degradation or water splitting are becoming major concerns these days. In this study, we will introduce novel efficient electrode materials and their fabrications to supercapacitor devices and efficient new photocatalyst materials for organic waste treatment.

### Biography:

Dr. 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 JKST 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).