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Education

PhD, Mechanical Engineering, Rice University

Key Interests

Nanomaterials | Polymers | Materials Science | Renewable Energy | Water Treatment | Water-Energy Nexus

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SELECT PUBLICATIONS

- › Huang, X. *et al.* (2020). Functionalized separator for next-generation batteries. *Mater*, 41, 143-155.
- › Dong, P. *et al.* (2017). A flexible solar cell/supercapacitor integrated energy device. *Nano Energy*, 42, 181-186.
- › Dong, P. *et al.* (2016). Solid-liquid self-adaptive polymeric composite. *ACS Appl. Mater*, 8(3), 2142-7.
- › Dong, P. *et al.* (2014). Vertically aligned carbon nanotubes/ Graphene hybrid electrode as a TCO- and pt-free flexible cathode for application in solar cells. *J Mater Chem A*, 2(48), 20902-20907.
- › Hao, F. *et al.* (2013). Recent advances in alternative cathode materials for iodine-free dye-sensitized solar cells. *Energy Environ Sci*, 6(7), 2003.

Research Focus

Water and energy are two of the world's most valuable resources. In the near future, as the industrial sector expands, demand for water and energy will be even greater than it is today. Water and energy systems are not isolated from each other; instead, they are intricately interconnected. Our research interests lie in the areas of materials design, advanced manufacturing, and device fabrication to address the integrated challenges space around the water-energy nexus.

We are also working on multiple interdisciplinary topics, i.e. self-adaptive biomimetic materials synthesis, in-situ fracture test of nanomaterials, and optical, mechanical, and electrochemical performance of energy and water treatment devices.

Current Projects

- Advanced materials design and synthesis: Advanced materials themselves have been widely implemented in energy and water areas. Moreover, hierarchical structures could give us the ability to create specifically tailored nanocomposites that combine the advantages of each material constituent to enhance functionality. Therefore, our work not only focuses on nanomaterials and polymer themselves, but also on their hybrid & hierarchical composites.
- Advanced materials enabled energy devices: Our efforts are dedicated to fabricating high-performance solar cells with advanced materials and manufacturing processes, and to integrating energy harvest devices and energy storage devices into one portable flexible energy system.
- Advanced material-enabled water treatment technologies: Among all water treatment methods, our work focuses on energy-efficient water desalination and water decontamination technologies, as well as renewable energy-powered, portable water treatment systems.