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“Magnetoresistive Nanocomposites for Electrochemical Energy Storage”

Friday, March 28

320 Shillman
11:45a – 1:00p

Refreshments will be served

ABSTRACT Electrochemical capacitors (ECs) have been in urgent demand for utilizing sustainable and renewable energy sources due to the concerns over both the depletion of fossil fuels and climate changes. However, the current ECs have some challenges, for example, high power but low energy densities for electric double layer capacitors or high energy but low power densities for pseudocapacitors. Main efforts have been focused on developing new electrode materials (for example, highly conductive composites with high capacitance), or designing hierarchical nanomaterials (for example, microstructures with shortened low-resistive pathways for electron transport and ion diffusion). Recently, a small magnetic field of about 0.072 T was reported to significantly enhance the capacitance by 155% in a novel magnetic graphene nanocomposite electrode. However, the measured positive giant magnetoresistance (GMR, a large resistance change upon applying a magnetic field) of the electrode materials failed to interpret the capacitance enhancement. Therefore, how the magnetic field affects the electrochemical energy storage remains unclear.

BIOGRAPHY Dr. Guo, Associate Professor of Chemical Engineering at Lamar University, holds a Ph.D. in Chemical Engineering from Louisiana State

University, and completed a three-year postdoctoral training in the Mechanical and Aerospace Engineering Department at UCLA. Dr. Guo directs the Integrated Composites Laboratory with more than 20 members and has authored/coauthored more than 160 peer-reviewed journal papers and five patents with a total citation over 3000 and h-index of more than 30. Scientific results have been reported by major media including *Nanotechweb* by the Institute of Physics, *Plastics Engineering Magazine* by the Society of Plastics Engineering, *MaterialsViews* by Wiley, *National Science Foundation*, etc. Dr. Guo has received *Honorary Nomination Award* of 2007 for UCLA-Chancellor Research, *University Merit Award* of 2012 for teaching, and *University Scholar Award* of 2013 for research at Lamar University. Dr. Guo had served as Chair for the Composites Division of AIChE (2011-2012). Dr. Guo's current research team focuses on multifunctional light-weight nanocomposites, especially with polymer and carbon as the hosting matrix to solve the energy and sustainability issues. The research activities are currently supported by NSF, American Chemical Society, Petroleum Research Fund and several global industrial companies.

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