



TEXAS TECH UNIVERSITY
Department of Mechanical Engineering

Materials and Mechanics in Energy Systems

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Abstract: There have been tremendous research efforts in energy systems to harvest renewable energy, reduce power consumptions, increase power efficiency, etc. The Energy Harvesting Materials Laboratory in the Department of Mechanical Engineering at Southern Methodist University has conducted research activities to harvest currently wasted energy and to reduce power consumptions by defect analysis in electronic materials. In this talk, ongoing research activities in the Energy Harvesting Materials Laboratory will be presented including (i) the development and optimization of acoustic energy harvesters, (ii) the defect analysis in ferroelectric random-access memory (FeRAM), and (iii) strain engineering in transparent conducting complex oxide heterostructures. These research studies are performed using finite element method, density functional theory, multiscale simulations, circuit analysis, and acoustic and circuit signal measurements.

Bio: Dr. You is an Assistant Professor in the Department of Mechanical Engineering at Southern Methodist University, Dallas TX. Dr. You received his B.Eng. degree in Mechanical Engineering from Chungang University, Korea in 1999. He received the M.S. degree in Mechanical Engineering from the University of Texas at Austin in 2002 and the Ph.D. degree from the University of Illinois at Urbana & Champaign in 2007. After PhD, Dr. You worked at the California Institute of Technology as a postdoctoral scholar until he joined the Mechanical Engineering department at SMU as an assistant professor in 2009. Dr. You currently directs the Energy Harvesting Materials Laboratory. His research interests include acoustic energy harvesting, noncontact implantable ultrasonic battery charger for bio-applications, defect analysis in electronic materials, transition-metal oxide heterostructures, ferroelectric phase transition, and transparent conducting films in solar cells.



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