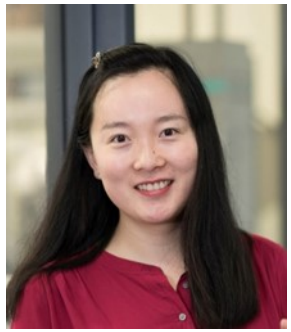
PRINCETON
Mechanical & Aerospace Engineering

Monday, March 4th

12:30 pm EQUAD Rm J223

Wood for energy and high temperature emerging technology



Tian Li

University of Maryland

Abstract

Wood for energy

Sustainable energy requires carbon recycling. Wood captures CO_2 from atmosphere and converts it into biomass. Combining its many economic and environmental benefit, wood provides a unique framework of selection for sustainable nanomaterials for energy management and conversion. In this seminar, we will take a glimpse of the immense opportunities offered by wood across diverse length scale from energy efficient buildings, water-energy nexus, to photon and phonon engineering, nanofluidics and ion/molecular regulation. Especially, when the channel reduces to sub-nm, new physics and transport mechanism arises which was utilized to achieve a record high ionic thermoelectric performance.

High temperature emerging technology

The high temperature synthesis (up to 3300 K) enabled by joule heating of carbon-based substrate opens a new paradigm of nanomaterials. In this seminar, I will talk about the heat recovery in a temperature region higher than 1300 K, where the current methods have been limited. We have developed a carbon-based all-in-one radiation receiver and thermoelectric device as well as a series of thermoelectric characterization techniques up to 3000 K. Enabled by the controllable heating profile toward guided synthesis, many new and exciting scientific discoveries on the correlations between high temperature synthesis-structure-properties await.

Bio

Dr. Tian Li obtained her bachelor's degree in School of Optical and Electrical Engineering from Huazhong University of Science and Technology in Wuhan, China in 2010. She then carried out graduate studies with Prof. Mario Dagenais in the area of microelectronics and electrophysics in Electrical Engineering at University of Maryland, where her research focused on the experimental and theoretical studies aimed at establishing a fundamental understanding of the principal electrical and optical processes governing the operation of quantum dot solar cells. Upon receiving her Ph.D., Dr. Li began postdoctoral studies with Prof. Liangbing Hu in the Materials Science at University of Maryland, where she has been working on multiple areas in energy conversion and management with materials innovation. Dr. Li has received recognitions such as Distinguished Dissertation Fellowship, Outstanding Graduate Assistant Award, Distinguished Summer Research Scholarship, HIVE 50 innovator and Forbes 30 under 30 in energy category, et al.