

Mechanical Engineering Seminar Series

- **Date:** Wednesday, May 24th, 2023
- **Time:** 5:00 PM KST In Person
- **Venue:** A211

Micro/Nanoscale Thermal Energy Transport and Application to the Development of a Thermoelectric Material Based on Silicon-Doped Graphene



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- Research Interests: Micro/nanoscale Heat Transfer, Renewable Energy, and Radiative Heat Transfer

Abstract

A clear understanding of micro/nanoscale thermal energy transport is essential in the design of thermal devices and manufacturing processes at micro/nanoscales such as semiconductors, thermoelectric modules, bio-chips, and so forth. In the presentation, firstly, we survey fundamental concepts and theoretical progress for describing thermal behavior of energy carriers in micro/nanoscale systems, especially the BTE (Boltzmann Transport Equation) based modeling, which accommodates full phonon dispersion relations and electron-phonon interactions. Then, we discuss the thermoelectric effect, the basic mechanism of thermoelectric refrigeration and thermoelectric power generation, and how to improve the efficiency of these thermoelectric devices. We introduce the silicon-doped graphene as a base material to reduce the thermal conductivity by enhancing the impurity scattering.