



SEMINAR: VISITING SCHOLAR

Tailoring Radiative Properties with Nanostructures for Solar Thermal Applications



Bong Jae Lee, Ph.D.

Associate Professor
Department of Mechanical Engineering
Korea Advanced Institute of Science and Technology (KAIST)

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Abstract:

The advancement of nanotechnology has enabled precise manufacturing of structures with feature sizes smaller than the characteristic wavelength of thermal radiation. Tailoring thermal radiative properties using micro-/nano-structured surfaces has drawn much attention due to potential applications in energy conversion devices, space thermal management, and infrared radiation detection. It has been demonstrated that thermal radiative properties can be spectrally and/or directionally controlled by exploiting electromagnetic resonance phenomena, such as surface plasmon and magnetic resonance, on structured surfaces. This presentation will address the fundamentals of electromagnetic resonance phenomena on sub-wavelength nanostructures and will provide some insights on the application of designed nanostructures in energy harvesting (e.g., photovoltaic and solar thermal devices). The second part of the presentation will introduce the design of a blended plasmonic nanofluid having broad-band absorption characteristic in the visible and near-infrared spectral region and its application to a volumetric solar thermal absorber.

Bio:

Dr. Bong Jae Lee is an Associate Professor in the Department of Mechanical Engineering at the Korea Advanced Institute of Science and Technology (KAIST). Prior to joining KAIST, he has worked in the Department of Mechanical Engineering and Materials Science at the University of Pittsburgh as an Assistant Professor for three years. He received his B.S. degree in Mechanical Engineering from Seoul National University in 2001 and his M.S. and Ph.D. degrees from the Georgia Institute of Technology in 2005 and 2007, respectively. Dr. Lee was the winner of the Georgia Tech Chapter of Sigma Xi Best Ph.D. Thesis Award in 2008 and was the recipient of the ASME - Hewlett Packard Best Paper Award (2nd place) in 2007. He also received Young Investigator Award from Thermal Engineering Division, KSME in 2014.