I²CNER Seminar Series

International Institute for Carbon-Neutral Energy Research (WPI-I²CNER)
Kyushu University

Title **Recent Developments in Low-Cost Vacuum Insulated Glazing (VIG) Technology**

Speaker Prof. Jungho Kim
Department of Mechanical Engineering, University of Maryland, US

Time& Date 4:00 PM(JST), Monday, June 12th, 2023

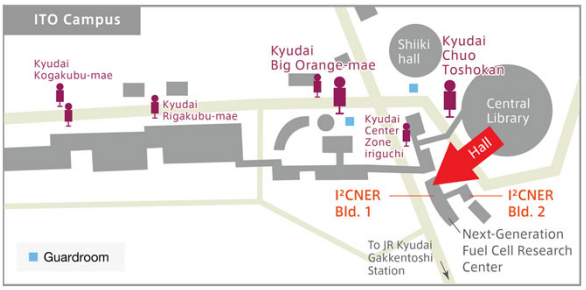
Venue Hybrid (#217, Conference Room, I²CNER Bldg. 1, Ito Campus / Webinar)

Abstract

Heat loss through windows consumes approximately 3.9 quads (1 quad=1015 BTU or 1 EJ) of primary energy in the US during the winters alone. Compared to the walls of a building which typically have R-values between 3.6 to 5.2 m²-K/W, single-pane windows and more advanced double pane windows have R-values between 0.18 to 0.52 m²-K/W and are often the cause of poor building thermal performance. Higher insulation values can be achieved by introducing additional glazing layers but at higher thickness, weight, and cost. Vacuum Insulated Windows (VIGs) provide an alternative approach to obtaining high R-values. VIGs are thin and can use slimmer, lighter frames. VIGs also offer excellent soundproofing and condensation resistance. Although the VIG concept was patented by Zoller in 1924, the first commercially successful VIG was only developed by the University of Sydney in 1989. They used two glass panes separated by cylindrical support pillars and glass frit edge seals. This VIG design is sold by NSG and is available in the market under the SPACIA brand. The cost of VIGs remains prohibitively expensive, however, due to high initial capital costs of the large ovens. The U. of Maryland with support by the Dept. of Energy has developed methods to produce VIGs using room temperature processes that should help lower costs by a factor of 5 thus stirring wide adoption.

About the Speaker

Jungho Kim is a Professor in the Department of Mechanical Engineering at the University of Maryland where he performs research and teaches courses in a broad range of thermal sciences areas. He developed the microheater array technique under NASA support to measure time and space resolved heat transfer rates during boiling and spray cooling. He was the principal investigator for a microgravity pool boiling experiment (MABE) that flew on the International Space Station in 2011. He has received funding in the past from NASA, NSA, NIST, Parker Hannefin, ONR, NSF, Northrup Grumman, WPAFB, ATEC, DOE, and Weatherbug. He as the former Chair of the ASME K-13 committee on Multiphase Heat Transfer, and has chaired numerous conferences on phase change heat transfer. He has won numerous awards for teaching and instrumentation design, and is the holder of three patents.



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Host Prof. Zhenying Wang

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