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INSTITUTO DE FÍSICA APLICADA E ENGENHARIA DE MATERIAIS
INSTITUTE OF APPLIED PHYSICS AND MATERIALS ENGINEERING

IAPME Seminar

Polymer aerogel composites for thermal management

7 January 2026

Prof. Wei FAN
Jiangnan University
Venue: N23-1004b
Time: 15:00 - 16:00
Hosted by: Prof. Binmeng CHEN

Abstract

Polymer aerogels have garnered increasing attention in the aerospace field due to their lightweight, and thermal insulation properties, demonstrating promising application prospects in thermal protection systems for aircraft and other vehicles. This report addresses key scientific challenges in the formation methods, pore regulation, and mechanical enhancement of polymer aerogels. A dynamic sol-gel transition strategy is proposed, enabling the continuous and stable formation of polymer aerogel composites. By introducing nanoparticles for pore regulation and reinforcement, the pore forming mechanism and mechanical strengthening principles of nanocomposite aerogels are elucidated. Furthermore, flame retardant and thermally insulating polyimide aerogel composites meeting aviation standards are developed, and their potential application in aircraft cabin thermal insulation systems is explored. These advances provide both theoretical foundations and technical support for the development of new functional composite materials in the aerospace field.

Biography

Prof. Wei FAN, is now a Professor and PhD supervisor in School of Chemical and Material Engineering at Jiangnan University. Her research focuses on aerogel composites, polymer-based nanocomposites and composites for thermal management. She has published over 90 research papers, which have been cited more than 7400 times (H-index = 51) according to Web of Science. She has been awarded Second Prize of Shanghai Natural Science in 2020. She serves as an editorial board member of Composites Science and Technology, and a youth editorial board member of Composites Communications and Advanced Nanocomposites.

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