NANYANG TECHNOLOGICAL UNIVERSITY SINGAPORE

School of Physical and Mathematical Sciences
College of Science

CBC SEMINAR ANNOUNCEMENT

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Polyimide-based Composite Aerogels for Thermal Insulation and Flame Retardancy

Due to their unique microstructure, aerogels show impressive properties, such as extremely high porosity, quite low apparent density, and considerably high surface area, which enable them to be attractive materials for applications in thermal insulating, chemical adsorbents, catalytic carriers, and electrical applications. Developing aerogels with controllable pores, outstanding mechanical properties and excellent thermal stability still remains a key challenge in evolution of aerogels. In this work, graphene reinforced polyimide (PI) composite aerogels were fabricated by an environmentally friendly freeze-drying technique followed by a thermal imidization process. The two-dimensional graphene oxide (GO) was simultaneously served as crosslinker, pore-tailoring agent, as well as reinforcing fillers. The as-prepared PI/GO aerogel showed excellent mechanical and thermal insulation properties, with a highest specific modulus of 229.9 Mpa cm^3 g^{-1} and lowest thermal conductivity of 28 mW m^{-1} K^{-1}. Furthermore, graphene/montmorillonite (G/MMT) hybrid synergistically reinforced PI composite aerogels were fabricated for flame retardancy. Through the strong interaction between GO and MMT, GO/MMT hybrid can be synergistically dispersed in water, providing good dispersibility in PI matrix, thus endowing the composite aerogels with enhanced thermal and flame-retardant properties.

Date: 27th June 2019 (Wednesday)
Time: 3.00 pm to 4.30 pm
Venue: SPMS Research & Graduate Studies Office Conference Room
Host: Associate Professor Ling Xing Yi