

Zoom Online Talk

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ADVANCEMENT OF SILICA AEROGELS FOR ENGINEERING APPLICATIONS



3:00pm - 5.00pm

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Synopsis

Recently, the advancement of silica aerogel aerogel for various engineering applications has put great interest of many researchers. This material is first synthesized in 1930's. However, in the field of material sciences, this material is one that is currently gathering momentum and one that is still actively being researched with incremental innovation around it happening progressively. Silica aerogel is derived from silica gel in which the liquid component of the gel has been replaced with a gas. The result is an extremely low density porous solid with several remarkable properties, most notably its effectiveness as a thermal insulator. Conventional silica aerogels available in the market are derived from chemicals (e.g., silicone alkoxides). These raw materials, although it offers high quality silica aerogels, are eventually less sustainable, costly and unfriendly to environment. The high cost of current commercial silica aerogels is prohibitive to cost sensitive industries such as housing. One of the current alternative precursors of silica aerogel is from rice husk which abundant agro-waste in Malaysia. This research will highlight the potential applications of silica aerogel which covers the applied composite-aerogel as a function of lightweight, thermal insulation to corrosion protection materials. Three (3) research areas were explored; first is the optimization of the silica aerogel synthesis toward commercialization, with the aims of reducing the overall cost while obtaining optimum properties. Second is the application of silica aerogel particles (i.e., granules) as a porous filler in polymer matrix composites for thermal insulation application. The last but not least is the development of lightweight silica aerogel composite panel which can be used in construction. With its exceptional abilities to insulate most occupied space while offers fire protection, the impact on sustainable construction technologies is very significant. The latest research will also explore the potential silica aerogel for corrosion protection, known as corrosion under insulation.

About the Speaker

Dr Muhamad Azizi Mat Yajid is an Associate Professor of Materials Engineering within the School of Mechanical Engineering, Faculty of Engineering, Universiti Teknologi Malaysia. He received his B. Eng (Hon's) Materials Engineering from University Science of Malaysia in 2000. He obtained MSc in Nanoscale Science and Technology from The University of Leeds, UK in 2004 and PhD degree in Materials Engineering from The University of Sheffield, UK in 2009. He is actively involved in various research projects mainly in the area of materials engineering and managed to publish more than 70 indexed papers in high reputable journals. His research interests include hard coatings, coatings for aerospace applications, thermal barrier coatings, thermal insulation material and composite, electroplating, engineering materials.

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Dr Muhamad Azizi Mat Yajid



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