TECHNOLOGY TRANSFER

Interest Exploratory Note

Silica Aerogel Based Composite Sheet

Indian Space Research Organization at its Vikram Sarabhai Space Centre (VSSC) has developed hydrophobic silica aerogel by a simple and cost-effective ambient pressure drying process. Using the developed aerogel powders, flexible, hydrophobic aerogel sheets have also been developed.

Salient Features

The composite sheets are made from Silica aerogel which is an exotic materials with a unique combination of properties. Low density and thermal conductivity coupled with high porosity and surface area make aerogel a 'super-insulator'. However, their cost, brittle and friable nature has limited its use to specialized applications.

VSSC/ISRO has developed the technology to develop flexible and hydrophobic sheets from the aerogel powder which expands a gamut of applications, making it suitable to be used as an ideal replacement for conventional insulation. The lab scale technology developed has been demonstrated in thermal protection system since PSLV C39.

Aerogel sheets are ideal to be used as wrap around insulation, which can be cut to desired size and integrated. Aerogel sheets developed in ISRO on the other hand are non-dusting and are easy to handle.

Properties

PROPERTY	VALUE ACHIEVED
Areal density, g/m^2 (gsm)	150 – 500
Thickness, mm	0.6 – 10
Thermal Conductivity (@ RT), W/mK	~0.03 (TPS method)
Dielectric Constant (@ 10 GHz)	1.3 – 1.6

Applications

- Wrap around insulation for use in pipelines/ feed-lines etc.
- For use as insulating layer in foot- insoles, boot / jacket insulation or as winter / Arctic apparel at areas having extremely cold climate.
- As low dielectric constant substrates over which circuits can be printed.
- Cryogenic thermal insulation.
- In multi-layer insulation.

Department of Space has authorised NSIL for Technology Transfer of Silica Aerogel Based Composite Sheet to suitable entrepreneurs/ Industry in India. Interested Parties may please fill the enclosed form and send by email to contact-nsil@isro.gov.in