

## **Multifunctional Nano Porous Organic Aerogels with Enhanced Mechanical & Physical Properties**

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Increasing demand of technology for novel metamaterials with unique properties such as high service temperature, super insulation and ultra-lightweight flexible structure motivated the development of new porous materials to be used in many fields such as aerospace, apparel, naval, transportation and construction. In this context aerogels with super thermal and acoustic insulating properties along with ultra-light weight are presenting very high potential to be developed as the next generation of novel insulation materials. As 85% to 99% of aerogel volume is consist of gas, they can present very exceptional properties such as high porosity and extremely low density comparable to air, with reported density as low as  $160 \text{ g/m}^3$  of graphene aerogels. On the other hand porous structure of aerogel gives them the possibility to present very high thermal insulation properties, with reported thermal conductivity as low as  $0.004 \text{ W/mK}$ . Acoustic properties of aerogels are also highly dependent to their porous structure design as well as their material. Therefore by tailoring aerogel porous structure it is expected to highly enhance mechanical, thermal and acoustic properties of aerogels.

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Project duration 2 to 3 terms