

Aerogels in aerospace: an overview

ABSTRACT

Aerogels are highly porous structures prepared via a sol-gel process and supercritical drying technology. Among the classes of aerogels, silica aerogel exhibits the most remarkable physical properties, possessing lower density, thermal conductivity, refractive index, and dielectric constant than any solids. Its acoustical property is such that it can absorb the sound waves reducing speed to 100 m/s compared to 332 m/s for air. However, when it comes to commercialization, the result is not as expected. It seems that mass production, particularly in the aerospace industry, has dawdled behind. This paper highlights the evolution of aerogels in general and discusses the functions and significances of silica aerogel in previous astronomical applications. Future outer-space applications have been proposed as per the current research trend. Finally, the implementation of conventional silica aerogel in aeronautics is argued with an alternative known as Maerogel.

Keyword: Maerogel; Aerospace industry; Aerogels; Silica aerogel