Track: **Green Buildings and Low Energy Architecture**, **Infrastructure for Green Energy**

Topic: **Financial evaluation ofsilica aerogels as thermal insulation materials in buildings**

Abstract

Silica aerogels are prepared via the sol-gel process which involves supercritical drying as the final stage in order to obtain thedesired thermal insulation properties. These aerogels have low thermal conductivity and high R-valuesas compared to conventional insulation materials such as fiberglass.Heating, ventilation, and air-conditioning accounts for approximately 40% of total energy use in commercial & residential buildings in the U.S.It is estimated that for every kg of CO_2 emitted during aerogel production, some 330 kg of emissions are avoided by its use as building insulation.

This study is adetailed financial analysis of benefits achievable from the incorporation of silica aerogel in curtain wall systems (exterior) of a building. Some of the benefits include passive solar heat gain, reduction in annual heating requirements & fuel cost, and reduction in CO_2 emissions. 11% reduction in gross seasonal heating requirement, and a reduction of 18% in CO_2 emissions are highlights of the derived benefits. An important cost driver here is the market price of aerogels, which can be reduced by up to 90% with increased adoptionworldwide. Procurement of silica from natural sources and incentives given to low energy architecture can help this cause.