

# Low cost silica aerogel insulation material

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**Abstract:** silica aerogels are characterized by extremely high porosity, low density, high specific surface area, and low thermal conductivity. However, the unique THREE-DIMENSIONAL network structure of silica aerogel limits its application in the field of thermal insulation materials. Due to the low mechanical strength and poor toughness of silica aerogel, its application is limited. The purpose of this study is to simplify the preparation process, reduce the cost, improve the mechanical properties and thermal insulation performance by using glass fiber felt as the reinforcement and silica black slurry as the silicon source, and to prepare the silica aerogel thermal insulation material with glass fiber toughening.

**Keyword:** silica aerogel; thermal insulation material; glass fiber; black slurry

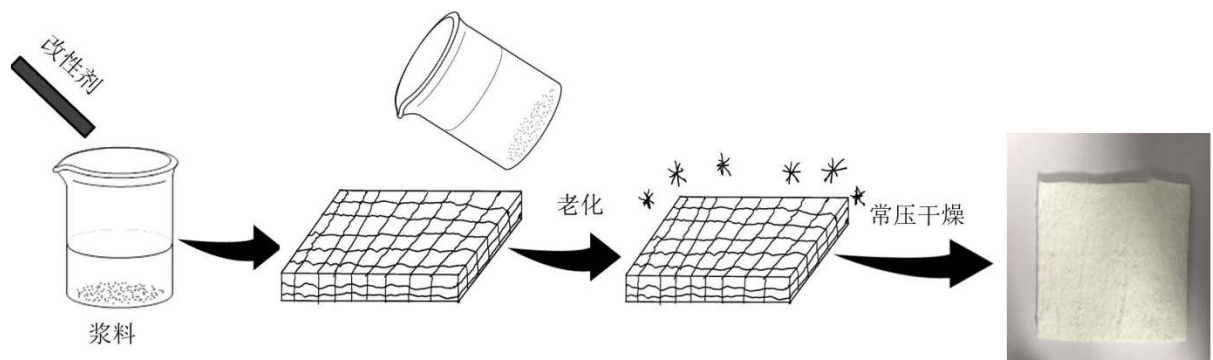


Fig.1 the preparation process of aerogels composites

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**References:** S.P. Patil, P. Shendye, B. Markert, Molecular dynamics simulations of silica aerogel nanocomposites reinforced by glass fibers, graphene sheets and carbon nanotubes: A comparison study on mechanical properties, COMPOSITES PART B-ENGINEERING190(2020).

C.L. Chiang, H.Y. Chou, M.Y. Shen, Effect of environmental aging on mechanical properties of graphene nanoplatelet/nanocarbon aerogel hybrid-reinforced epoxy/carbon fiber composite laminates, COMPOSITES PART A-APPLIED SCIENCE AND MANUFACTURING 130( 2020).

J.Q. Tian, S. Shafi, H.J. Tan, et al, Mechanical and thermal-insulating performance of silica aerogel enhanced jointly with glass fiber and fumed silica by a facile compressing technique , CHEMICAL PHYSICS LETTERS, 739(2020).