

Silica Aerogel Fibers- a feasibility study

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Aerogels are today the lightest solid and the best thermal insulating materials in the world. The high porosity and surface area of aerogels allow them to be used in a variety of environmental applications like filtration or catalyst carrier. Due to their nano-porosity, aerogels offer an internal surface area up to 2000 m²/g. Among different aerogels, silica is the most common product. On one hand, silica is inorganic and thermal stable up to 1100 °C; on the other hand, the material is brittle and rigid. The combination of its brittleness and its ultrahigh porosity (over 80 %) makes silica aerogels very difficult to be processed into a useful product. Silica aerogel is not resistant to impulses and vibrations and its applications have been very limited. However, it is already possible to make brittle materials flexible. Some examples are glass, ceramic and carbon fibers; those are nowadays used for several applications in the form of flexible textiles and fabrics. Aim of this work is to introduce a new developed process for the production of silica aerogel fibers (Fig.1). The fibers have been successfully produced and showed the same porosity and pore structure like in their corresponding bulk material (Fig.2).

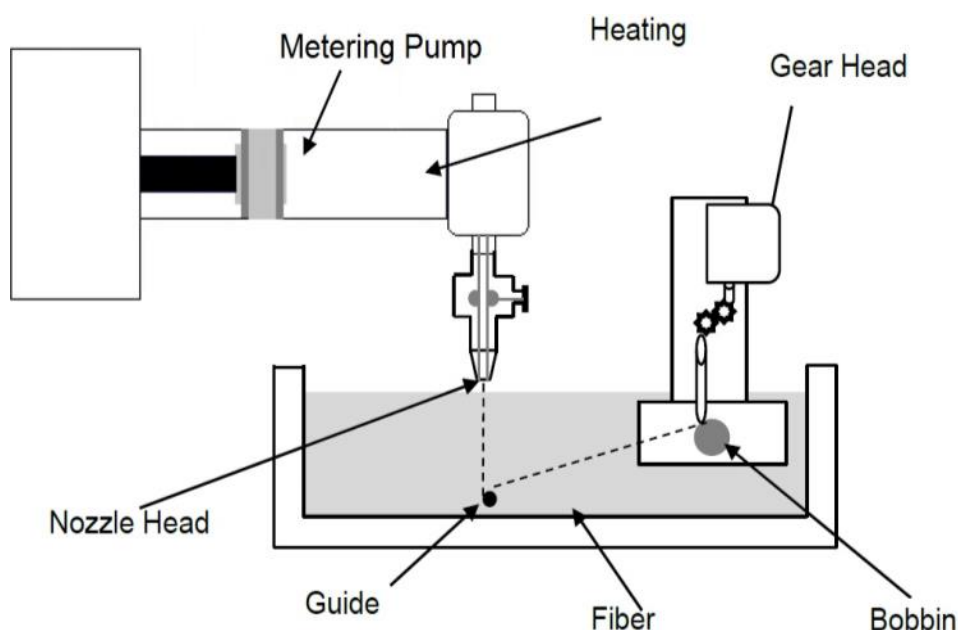


Fig. 1: Scheme of the spinning plant.

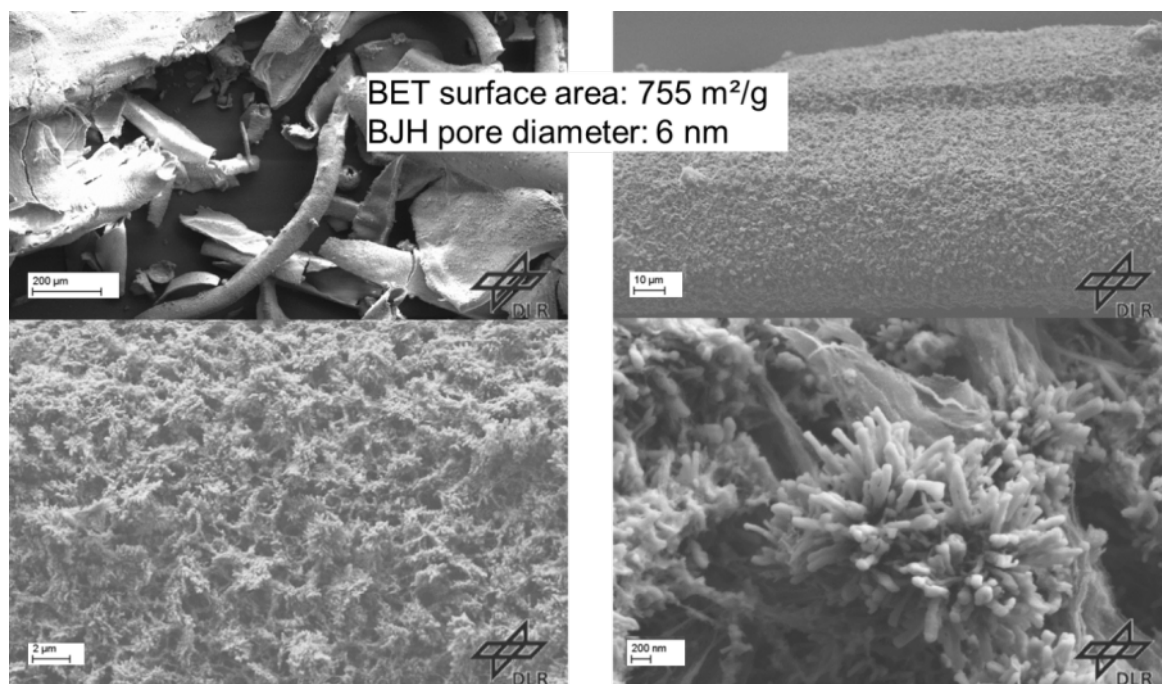


Fig. 2: SEM Picture of the fiberized silica aerogel its surface and detail of the porous structure.