Aerogel glazing

General description

Aerogels are the world's lightest solid materials, composed of up to 99.8% air by volume. Most aerogels are based on silicium dioxide (SiO₂), like glass, but their density is about a 1000 times smaller. Because of their very high porosity, aerogels have the lowest thermal conductivity values of any solid. They considerably reduce the three phenomena of heat transfer: convection, conduction and radiation.

Since the transmittance of light in aerogels is relatively large, they can be used as semi-transparent glazing elements in daylight design. A space of 30 mm or 60 mm between two glass panels has a Uₜ value of respectively 0.6 W/m²K or 0.3 W/m²K. Both values are smaller than the value of 0.8 W/m²K required for windows according to passive house standards.

Availability on the market

In Belgium: unknown Abroad: Germany, U.S.A.

Advantages

- Although the thickness of the aerogel-based glazing may be high, its weight remains limited due to the relatively low density of the aerogel (3kg/m³).
- Unlike double and triple glazing, the Uₜ value of an aerogel-based glazing does not vary at all depending on the inclination of the glazed surface. The thermal insulation of horizontal and vertical surfaces is similar.
- The glass panes around the aerogel can be freely chosen.
- Aerogels are also very good acoustic insulators. (note: the acoustic performance of a window also depends on other characteristics)
- Aerogels seem to be resistant to UV and have high color stability.

Disadvantages / Constraints / Related issues

- Aerogel-based glazings transmit around 80% of light per 10 mm, meaning that an aerogel filling of 60 mm has a transmittance of approximately 30%. The transmitted light is diffused. Aerogels cannot be used in see-through windows, but their ability to diffuse the light can be an advantage to avoid glare and ensure a uniform lighting.

References

- [http://www.usdaylight.com/nanogel](http://www.usdaylight.com/nanogel)

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