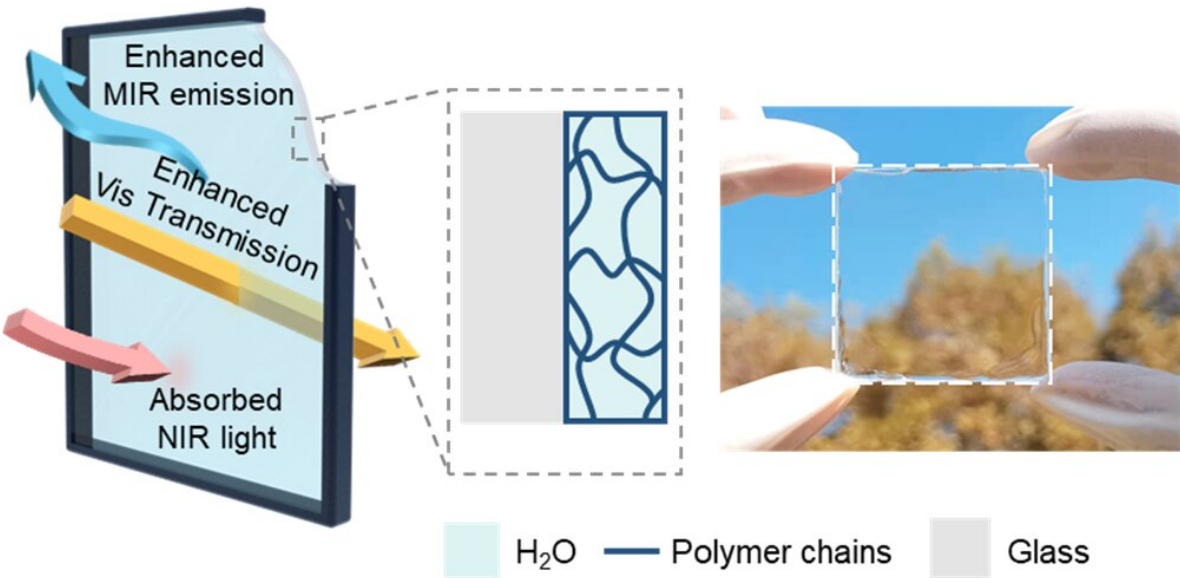


Hydrogel glass: a novel glass design for energy saving in buildings

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Structure design and working principle of the hydrogel-glass. Credit: Jia Fu et al

Energy use in buildings contributes to over 40% of the world's total energy consumption, of which lighting and space cooling make up a significant proportion. Traditional glass windows have been used for centuries; however, they are not energy-efficient. In the summer, the near-infrared sunlight transmitted through windows produces undesired

heating, and the high reflection of mid-infrared limits heat rejection from the building.

This "[greenhouse effect](#)" aggravates cooling [energy consumption](#). How to manipulate the near- and mid-infrared light through the [windows](#) to reduce cooling consumption while maintaining the high visible transparence for lightning remains a very challenging problem for the design of glasses.

Researchers at Wuhan University in China, led by Prof. Kang Liu, propose a novel design of hydrogel-glass that consists of a layer of hydrogel and a layer of normal glass. Compared with traditional glass, the hydrogel-glass possesses a higher level of visible light transmission, stronger near-infrared light blocking, and higher mid-infrared thermal emittance.

With these properties, the researchers demonstrate the hydrogel-glass windows can enhance indoor illumination and reduce the indoor temperature. Simulations show that the novel window can reduce the [energy use](#) of building lighting and cooling ranging from 2.37 to 10.45 $\text{MJ}\cdot\text{m}^{-2}\cdot\text{year}^{-1}$ for different cities around the world. The work was published in *Frontiers of Optoelectronics*.

More information: Jia Fu et al, Broadband light management in hydrogel glass for energy efficient windows, *Frontiers of Optoelectronics* (2022). [DOI: 10.1007/s12200-022-00033-4](https://doi.org/10.1007/s12200-022-00033-4)

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