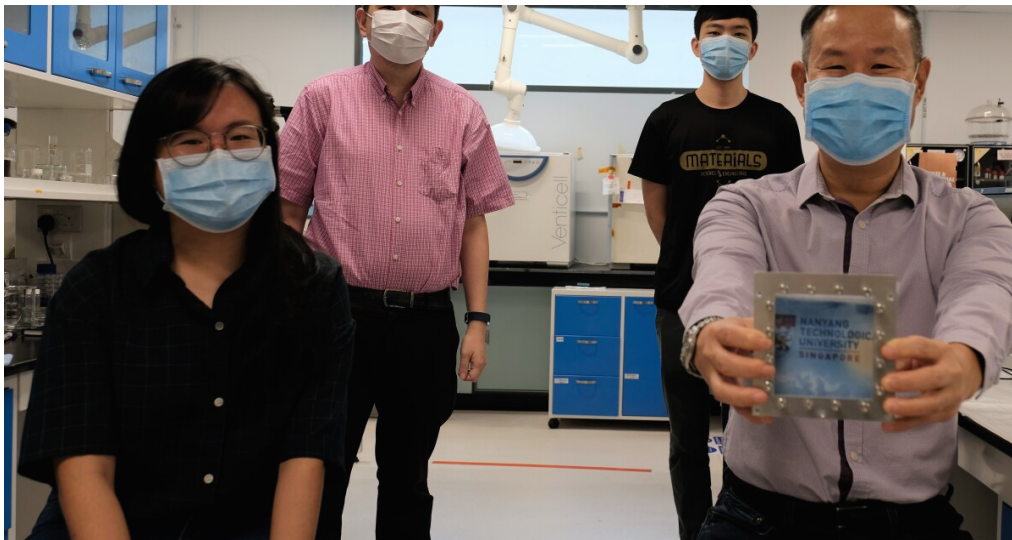


Science

The switchable window material remains transparent while blocking the heat of the sun

kriskaito • 7 hours ago



As sunlight passes through the windows of a building, the temperature inside the room rises, which can lead to the need to use air conditioning systems that consume large amounts of electricity in the structure. However, the new switchable glazing remains almost transparent, blocking incoming heat.

First of all, there *that is* Already a window Electrochromic glass, It is electronically colored on demand. However, when the glass gets dark, it becomes difficult to see through. In addition, such windows partially block the visible spectrum of sunlight, but not necessarily the infrared spectrum that produces heat.

That's where new materials come in.

Developed by scientists at Nanyang Technological University in Singapore and Hebrew University of Jerusalem in Israel, it consists of an inexpensive mixture of titanium dioxide, tungsten trioxide, neodimethyl-niobium and tin oxide. It is applied as a coating to regular glazing and connected to electrical circuits.

If you need the extra heat provided by the sunlight, such as during the winter, keep the material switched off. This allows all the infrared rays of the sun to pass through. However, it turns on during the warmer months. Simulations show that the material blocks up to 70% of the incoming infrared light and allows it to pass up to 90% of the sun's visible light.

In addition, existing electrochromic windows have been reported to begin to lose function after 3-5 years of use, but tests involving repeated on / off cycles have shown that new materials have a much longer lifespan. It has been.

In addition, windows incorporating this technology can be coated with an electronically switchable film created by the same team. This film uses carbon nanoparticles to conduct or block the passage of ambient heat from the outdoor environment.

"Because this technology, with the ability to control both infrared radiant heat from the sun and conducted heat through windows, can be used by building occupants to adjust for heat loss or increase as needed. I hope it will be especially useful in warm climates, enjoying the many landscapes as the seasons change," says Dr. Ron Goei, the lead author of a paper on Nanyang's research.

The paper was recently published in a journal *ACS Omega*..

source: Nanyang Technological University

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