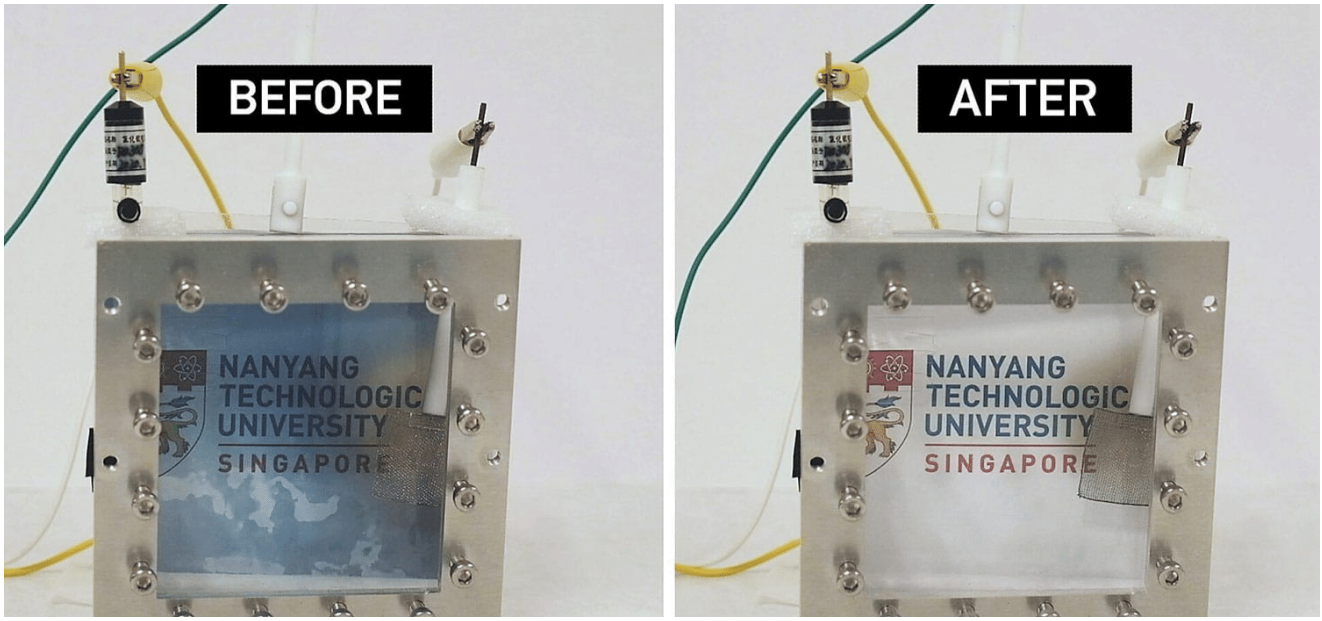

The 'smart' window material blocks heat without blocking visible light | Photo source NTU Singapore

RESEARCHERS CREATE WINDOW COATING TO BLOCK INFRARED LIGHT

ARCHITECTURE & DESIGN

The researchers believe that new electrochromic technology will help save energy that would be spent on heating and cooling buildings, playing a key role in the future design of sustainable green buildings

Spotted: Researchers at Nanyang Technological University, Singapore have designed a smart material for windows that blocks the sun's rays – controlling heat transmission, without blocking views. The new material is promising as it could help cut the energy required to cool and heat buildings.

The invention could block up to 70 per cent of infrared radiation without compromising the transparency of the window – still allowing up to 90 per cent of visible light to pass through. It is also believed to be around 30 per cent more effective in regulating heat than the electrochromic windows currently on the market. In addition, its durability showed it to be more economical than existing electrochromic components that tend to degrade in three to five years.

The material works by blocking infrared radiation from sunlight. The material is made up of an inexpensive mixture of titanium dioxide (TiO_2), tungsten trioxide (WO_3), neodymium-Niobium (Nd-Nb) and tin (IV) oxide (SnO_2), and is designed to be coated onto window panels, like paint.

One particularly exciting aspect of the development, is that the material is activated by electricity, meaning that users would be able to turn the material's infrared blocking properties on and off, like the switch of a light

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“With the ability to control both infrared radiated heat from the sun and conducted heat passing through the window, we expect this technology to be particularly useful in temperate climates, as building occupants can use it to regulate heat loss or gain according to the needs of the changing seasons, while still enjoying much of the view,” says Dr. Ronn Goei, the first author of the study.

The researchers also created a switch made from carbon-based magnetic particles and thin films that conduct heat. Heat can only pass through the glass window when the switch is on.

The energy required to control the environment within buildings makes a significant contribution to greenhouse gas emissions. At Springwise, we have spotted several innovations aimed at this problem. These include a smart ventilation system, and a smart home power management system.

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29th November 2021
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Takeaway:

Air conditioning devices are extremely energy hungry. It is estimated that there are over 1 billion single-room air conditioning units in the world right now. Reports foresee that there will be over 4.5 billion by 2050. As temperatures rise with climate change, the International Energy Agency projects that air conditioning will use about 13 per cent of the electricity worldwide, emitting 2 billion tonnes of CO2 every year. Innovations, such as the smart window coating developed by Nanyang Technological University, that allow for better thermal regulation can help to tackle this by reducing our reliance on air conditioning systems.