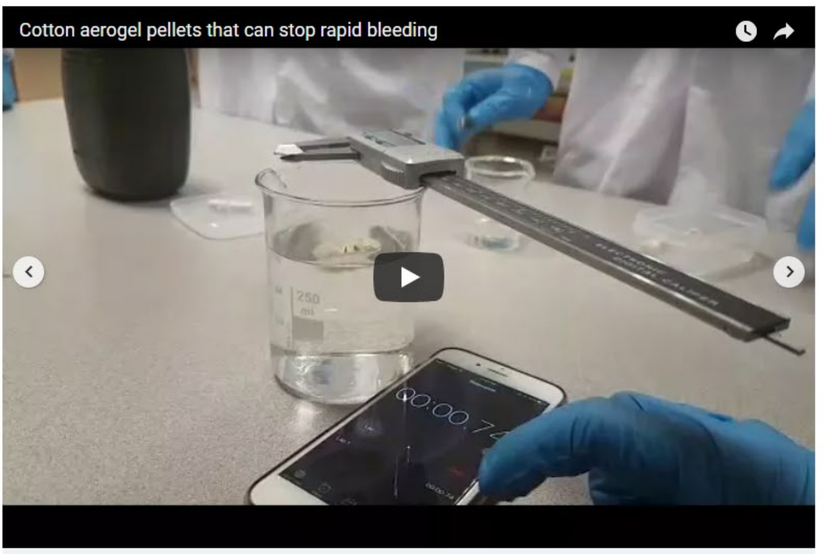
NUS team finds new purpose for old clothes



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Aerogel created from cotton can stem bleeding, clean up oil spills

Samantha Boh

Local scientists have found new use for old clothes, turning disused cotton fabrics into material that can be used to save lives.

The fabrics can be used to make ultra-light but highly absorbent aerogel pellets in labs.

These porous pellets expand when put in a liquid and can be used to stem bleeding in gunshot wounds or other deep wounds.

The aerogel can also be used to clean up oil spills.

Aerogels, usually made of materials like wood and glass fibres, are not widely used due to cost and are currently not available commercially in pellet form. Commercial aerogels are typically produced in sheets.

Now a National University of Singapore (NUS) team has found a faster and cheaper way to create aerogel by using cotton fabrics.

The finding by Associate Professor Hai Minh Duong and Professor Nhan Phan-Thien of the NUS department of mechanical engineering was published in the scientific journal Colloids and Surfaces A earlier this month.

At a press conference yesterday at NUS, the team said the cotton aerogel can absorb blood three times faster than the sponges commonly used to stop the loss of blood in deep wounds.

MULTI-FUNCTIONAL

The heat insulation property of the novel cotton aerogel can be applied to various consumer products, such as cooler bags to keep food items fresh.

PROFESSOR NHAN PHAN-THIEN, explaining some of the practical applications of his team's discovery.

Prof Duong said the cotton aerogel can be made in just eight hours, a lot faster than the time taken to create aerogels through commercial fabrication processes, making cotton aerogel cheaper to produce. "It is also stronger, making it more suitable for mass production," he added.

Prof Duong said a cotton aerogel pellet, about 1cm in diameter, can expand to 16 times its size in 4.5 seconds. About five to six are needed to stop the bleeding in a gunshot wound.

The aerogel can also be used as a thermal insulator. The NUS team has collaborated with DSO National Laboratories, Singapore's largest defence research and development organisation, to develop a lightweight thermal jacket for water bottles, using cotton aerogel.

The jacket can help to maintain the temperature of ice slurry - crushed ice and liquid water - in military water bottles at minus 2 deg C for four hours. Currently, military water bottles can keep water cold for only about 30 minutes in Singapore's tropical climate.

The thermal jacket, which weighs about 200g, features a cotton aerogel layer embedded in common fabrics to provide heat insulation. It cost about $8 to make. A vacuum flask usually used to keep drinks cold for hours can cost about $90.

Prof Phan-Thien said: "The heat insulation property of the novel cotton aerogel can be applied to various consumer products, such as cooler bags to keep food items fresh." He said the cotton aerogel can also be used to insulate pipelines for transporting liquefied natural gas, which needs to be stored at a low temperature.

The team is in discussions with a Singapore and United States company to commercialise the cotton aerogel.

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