3D printed chain mail smart fabric stiffens on-demand

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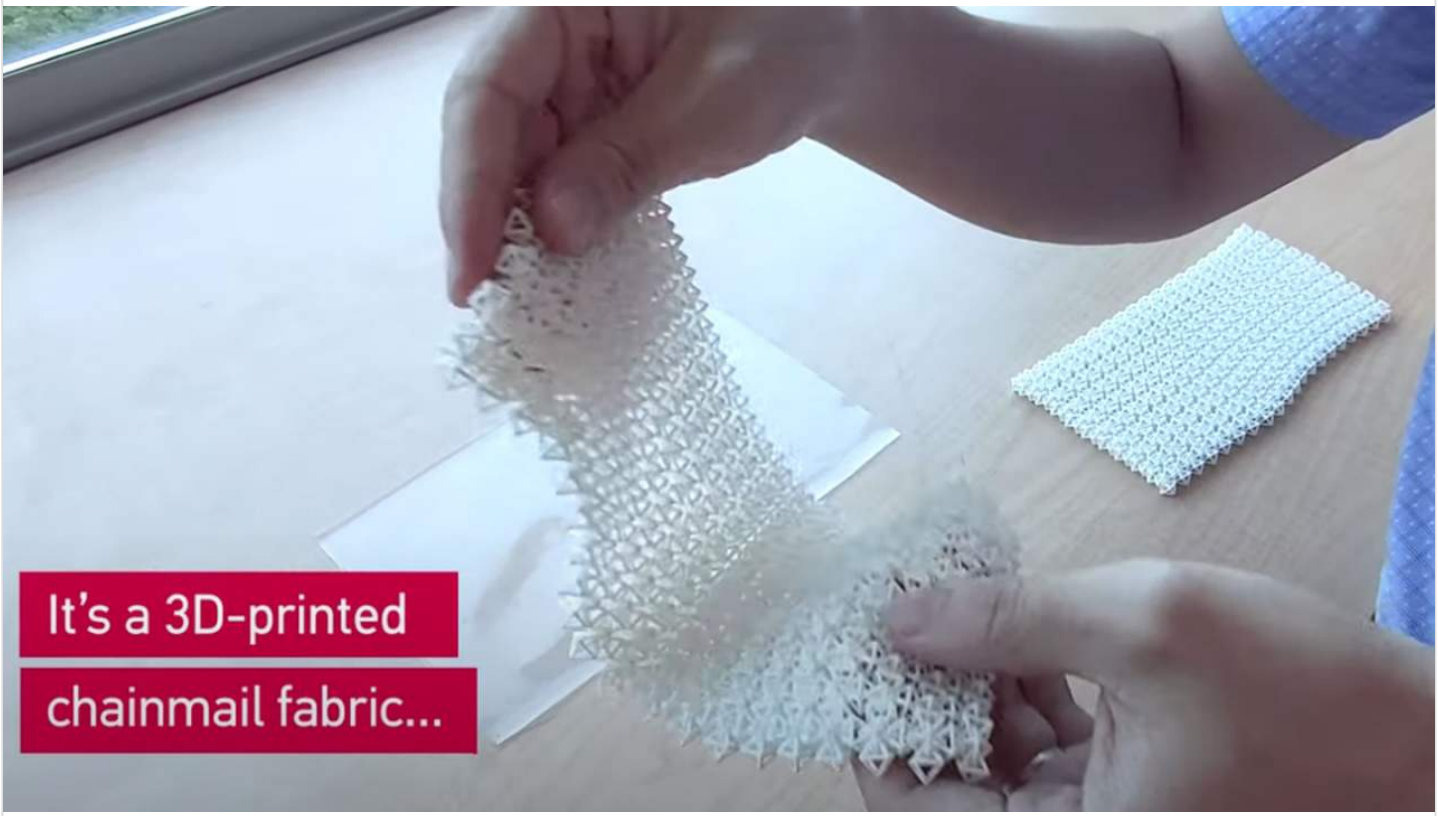


A team of researchers, including scientists from NTU Singapore and Caltech, have been working to develop a new smart fabric that is soft and flexible but can stiffen on-demand. The material is flexible like a piece of cloth yet can provide protection to the wearer when needed. It's 3D printed from a nylon polymer and consists of hollow octahedrons.

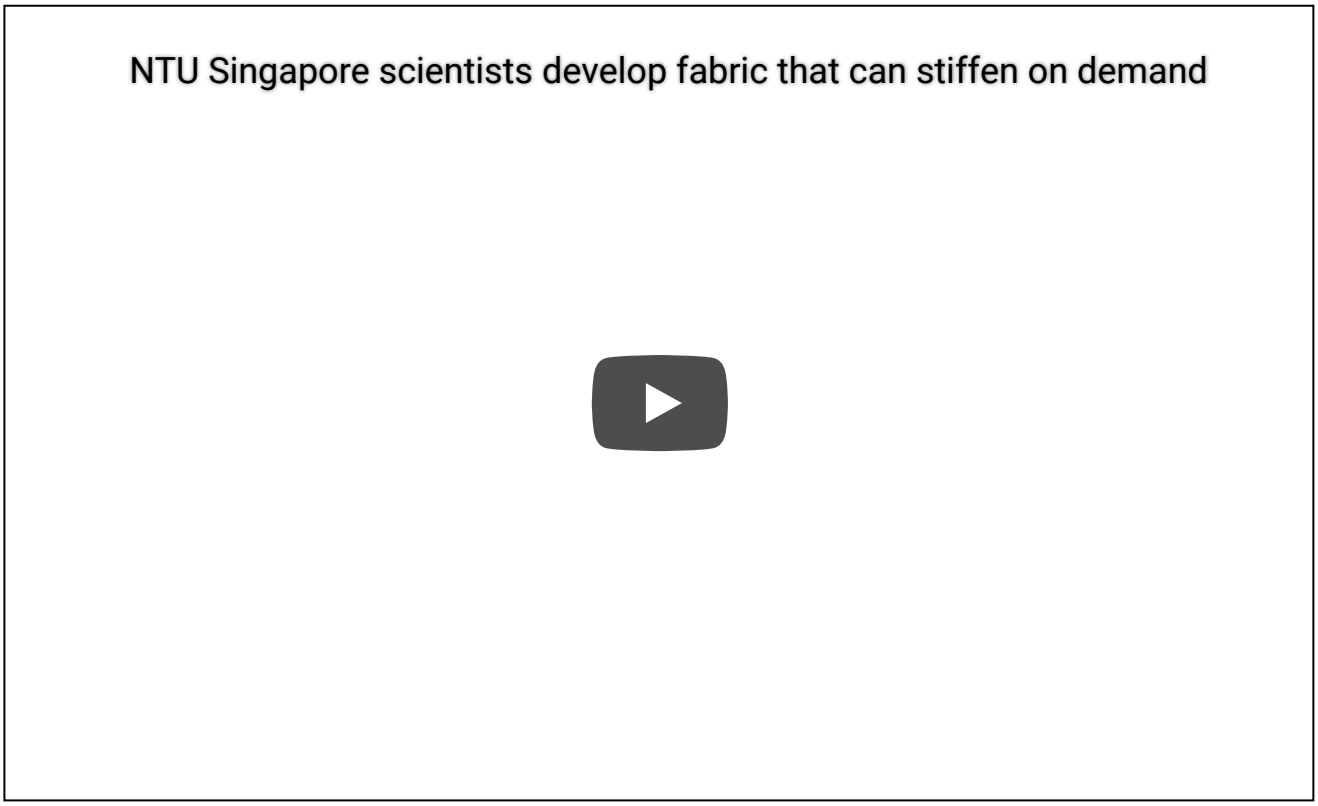
An octahedron is a shape made of eight equal triangular faces that somewhat resembles a diamond shape. When researchers vacuum sealed the material (https://www.ntu.edu.sg/news/detail/%27smart%27-fabric-that-can-stiffen-on-demand), they discovered it becomes 25 times more rigid and can hold over 50 times its weight. The new fabric has some interesting potential applications in multiple industries.

Perhaps the most obvious application would be in lightweight armor to protect against impacts for law enforcement or military applications. The fabric might also find use in protective gear for athletes to help prevent head trauma and other injuries. One of the more

interesting potential uses for the material is creating exoskeletons to help people walk and handle objects with less impact on the body.

In the future, the research team wants to improve the performance of the chain mail they have created and investigate other methods of stiffening the fabric. Currently, stiffening is accomplished by vacuum sealing the 3D printed material. However, researchers want to determine if they can stiffen the material using magnetism, electricity, or temperature changes in the future.

Him



The problem with using vacuum sealing the smart fabric in real-world use is that a puncture of the bag surrounding the material could potentially lead to loss of protection. Interestingly, researchers on the project liken their material to Batman's cape. The superhero's cape is a soft and flexible fabric in most instances but can be stiffened and used like a glider.