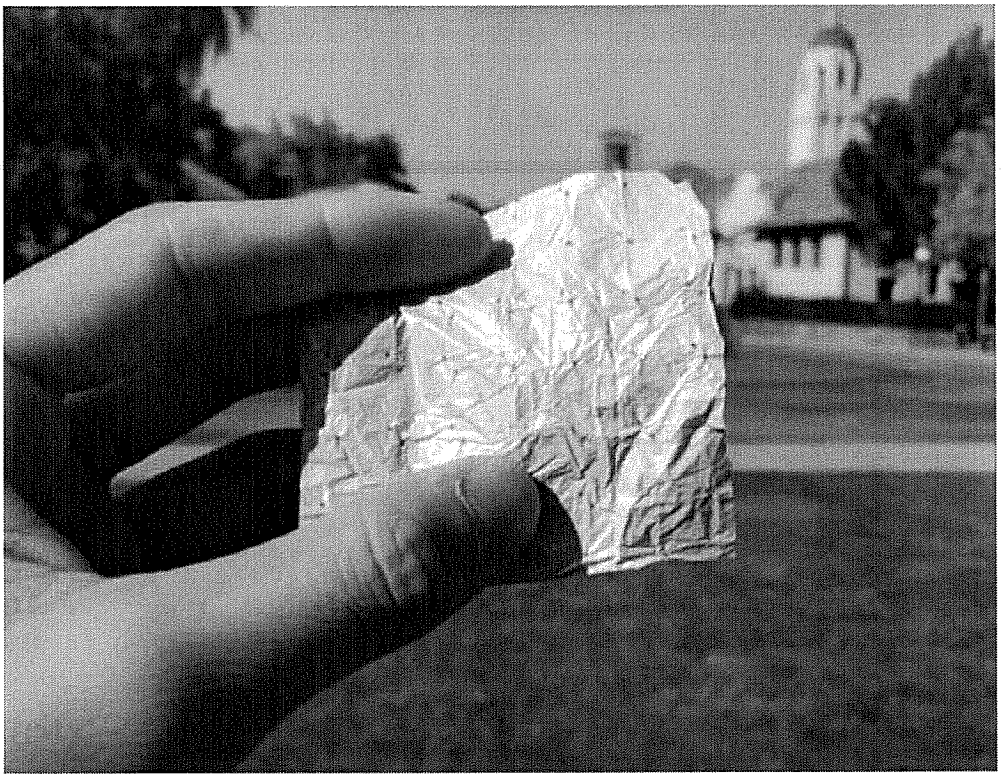
New Plastic-Based Textile Helps Cool You Off

By Kacey Deamer, Staff Writer | October 24, 2016 04:02pm ET



Researchers engineered a low-cost plastic material that could become the basis for clothing that cools the wearer.

Credit: Stanford University/YouTube

A new type of fabric could keep people cool in hot climates and reduce the need for expensive and energy-consuming air conditioning, a new study finds.

A team of researchers has developed a low-cost, plastic-based textile that allows the body to release heat in a new way. Just as sweating is one way the body cools off, the new clothing could help people reduce body heat. This cooling clothing could allow for air-conditioning to be set to a lower output than usual while still ensuring people stay cool, the researchers noted.

Heating and cooling spaces contribute to 12.3 percent of total energy consumption in the U.S., according to the researchers. Efforts to reduce energy use have focused on improving building insulation and enabling "smart" temperature control. However, engineers studying "personal thermal management" found that providing heating or cooling only to one person — rather than the power needed to cool an entire building — would result in far higher energy efficiency. [Gallery: Futuristic 'Smart Textiles' Merge Fashion with Tech]

"If you can cool the person rather than the building where they work or live, that will save energy," Yi Cui, one of the study authors and an associate professor of materials science and engineering, and of photon science at Stanford University, said in a statement.

As with ordinary fabrics, the new material allows perspiration to evaporate. However, its other, new cooling mechanism works by allowing the heat the body emits as infrared radiation to pass through the textile, the researchers explained.

"Forty to 60 percent of our body heat is dissipated as infrared radiation when we are sitting in an office," said study co-author Shanhui Fan, a professor of electrical engineering at Stanford University who specializes in photonics, the study of visible and invisible light. "But until now, there has been little or no research on designing the thermal radiation characteristics of textiles."

The researchers used a commercially available plastic material — nanoporous polyethylene (nanoPE), which has interconnected pores 50 to 1,000 nanometers in diameter and is used in batteries as a separator to prevent electrical shorting. NanoPE's pores allow for infrared waves to be released. In lab tests, the researchers found that nanoPE allowed 96 percent of the infrared radiation to pass through. By contrast, cotton permitted only 1.5 percent of the infrared radiation to pass through.

If woven into clothing, the nanoPE material could make the wearer feel nearly 4 degrees Fahrenheit cooler than if they were wearing cotton clothing, the researchers said.

As the scientists continue their research, they are adding more colors, textures and other characteristics to the nanoPE material to make it more cloth-like.

The findings were published online Sept. 1 in the journal Science.

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