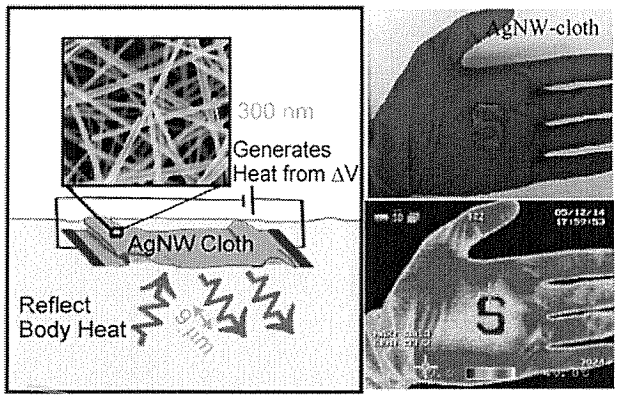
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Nanowire clothing could keep people warm—without heating everything else

7 January 2015



To stay warm when temperatures drop outside, we heat our indoor spaces—even when no one is in them. But scientists have now developed a novel nanowire coating for clothes that can both generate heat and trap the heat from our bodies better than regular clothes. They report on their technology, which could help us reduce our reliance on conventional energy sources, in the ACS journal *Nano Letters*.

Yi Cui and colleagues note that nearly half of global energy consumption goes toward heating buildings and homes. But this comfort comes with a considerable environmental cost - it's responsible for up to a third of the world's total greenhouse gas emissions. Scientists and policymakers have tried to reduce the impact of indoor heating by improving insulation and construction materials to keep fuel-generated warmth inside. Cui's team wanted to take a different approach and focus on people rather than spaces.

The researchers developed lightweight, breathable mesh materials that are flexible enough to coat normal clothes. When compared to regular clothing material, the special nanowire cloth trapped body heat far more effectively. Because the coatings are made out of conductive materials, they can also be actively warmed with an electricity source to further crank up the heat. The researchers calculated that their thermal textiles could save about 1,000 kilowatt hours per person every year—that's about how much electricity an average U.S. home consumes in one month.

More information: "Personal Thermal Management by Metallic Nanowire-Coated Textile" *Nano Lett.*, Article ASAP. DOI: 10.1021/nl5036572

Abstract

Heating consumes large amount of energy and is a primary source of greenhouse gas emission. Although energy-efficient buildings are developing quickly based on improving insulation and design, a large portion of energy continues to be wasted on heating empty space and nonhuman objects. Here, we demonstrate a system of personal thermal management using metallic nanowire-embedded cloth that can reduce this waste. The metallic nanowires form a conductive network that not only is highly thermal insulating because it reflects human body infrared radiation but also allows Joule heating to complement the passive insulation. The breathability and durability of the original cloth is not sacrificed because of the nanowires' porous structure. This nanowire cloth can efficiently warm human bodies and save hundreds of watts per person as compared to traditional indoor heaters.

Provided by American Chemical Society