Advanced adaptive cooling fabric

Unmet Need

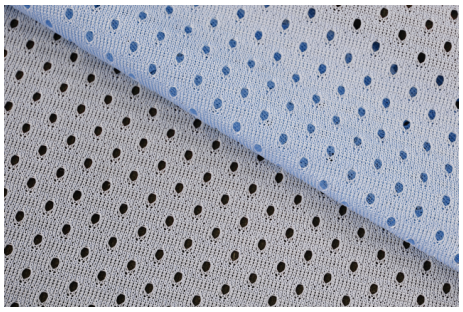
With the rise of temperatures due to global warming, the risk of heat-related illnesses such as heat exhaustion and heatstroke is on the rise as well. Some of the most vulnerable are those spending lots of time outdoors: construction workers comprise a mere 6% of the U.S. workforce but account for 36% of all heat-related deaths on the job. There is a need for more efficient and effective cooling fabric technologies to not only provide comfort to the wearer but prevent potentially dangerous side effects from overheating.

Technology

Duke inventors have developed an advanced adaptive cooling fabric technology. This is intended to be used in a variety of consumer products ranging from athletic apparel to workwear. Specifically, this fabric utilizes an adaptive vent technology, where vents within the fabric open under heat and sweat conditions to improve cooling effects and close in the absence of those conditions to retain heat. This is done utilizing a composite material comprising nylon and silver: when the composite material experiences an increase in heat the silver expands and the nylon contracts forcing vents in the fabric to open, allowing for a completely passive system of cooling. This has been demonstrated through a working prototype of the fabric with an increase of 30.7% in the thermal comfort zone of traditional static fabrics.

Advantages

- Increases thermal comfort zone by 30.7%
- Vents not only open under heat conditions but close under cold to conserve heat
- Traditionally, textiles were developed to optimize one comfort aspect such as moisture-wicking, heat conduction, convection, etc., and this technology is



effectively able to combine them

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Meet the Inventors

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Publication(s)

External Link(s)

- From the lab of Dr. Po-Chun Hsu
- Innovative textile vents to release heat when you sweat (EurekAlert!, 2021)
- Duke professor lands $500,000 for heat-managing wearable device development (WRAL, 2022)
- Innovative Textile Vents to Release Heat When You Sweat