UT researchers develop thermal interface material for improved chip cooling

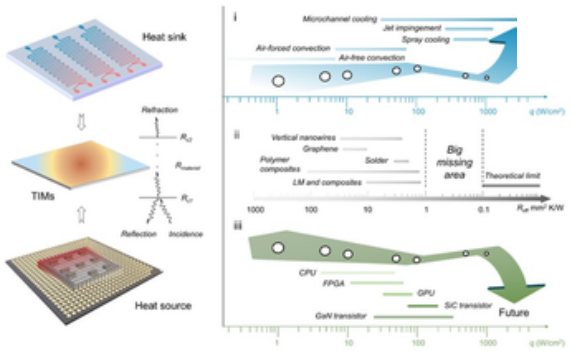
New interface material can reportedly remove 2,760 W of heat from a 16 sq cm area

November 05, 2024 By: **Dan Swinhoe** Have your say

A new material has been developed by Texas researchers that can reportedly offer improved cooling capabilities to data centers.

Researchers at the University of Texas at Austin have created a new "thermal interface material" that could organically remove heat from high-powered electronic devices, which they claim could reduce or even eliminate the need for extensive cooling.

The new material, made from a mix of liquid metal and aluminum nitride, is said to be much better at conducting heat than current commercial materials, making it optimal for cooling.



– University of Texas at Austin

The material was created using a process called mechanochemistry, which helps the liquid metal and aluminum nitride mix in a controlled way to create gradient interfaces, making it easier for heat to move through them.

The researchers have tested their materials on small lab-scale devices. The team is in the process of scaling up material synthesis and preparing samples to test with partners in data centers.

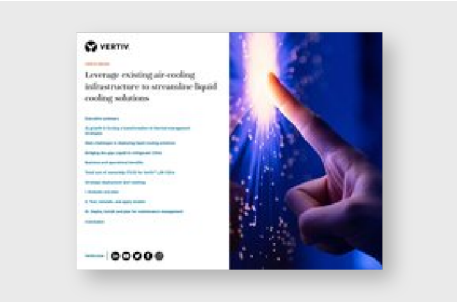
The new material, published in Nature Nanotechnology, can reportedly remove 2,760 watts of heat from a small area of 16 square centimeters – when coupled with microchannel cooling. UT said the technology can cut the energy needed for the cooling pump by 65 percent.

"The power consumption of cooling infrastructure for energy-intensive data centers and other large electronic systems is skyrocketing," said Guihua Yu, professor in the Cockrell School of Engineering's Walker Department of Mechanical Engineering and Texas Materials Institute. "That trend isn't dissipating anytime soon, so it's critical to develop new ways, like the material we've created, for efficient and sustainable cooling of devices operating at kilowatt levels and even higher power."

Researcher Kai Wu added: "This breakthrough brings us closer to achieving the ideal performance predicted by theory, enabling more sustainable cooling solutions for high-power electronics. Our material can enable sustainable cooling in energy-intensive applications, from data centers to aerospace, paving the way for more efficient and eco-friendly technologies."

The research team includes Chuxen Lei of UT's Materials Science and Engineering program and collaborators Zhengli Dou, Shibo Deng, Die Wu, Bin Zhang, Runlai Li, Yongzheng Zhang and Quiang Fu of Sichuan University, and Haobo Yang of Huazhong University of Science and Technology.

More in Cooling



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