DROPLET HOTSPOT COOLING DUE TO THERMOTAXIS

Tech ID: 33862 / UC Case 2025-073-0

PATENT STATUS

Patent Pending

BRIEF DESCRIPTION

Effective thermal management remains a critical challenge in designing and operating next-generation electronics, data centers, and energy systems. Devices are steadily shrinking and handling increased power densities. Traditional cooling strategies, such as heat sinks and immersive cooling systems, fall short in delivering the targeted, localized cooling needed to prevent or address thermal hotspots. Current solutions for localized hotspot cooling require active, energy-intensive methods like pumping of coolants and complex thermal architecture design.

To overcome these challenges, UC Berkeley researchers present a transformative passive method for localized, autonomous cooling of hotspots. The cooling system delivers effective, localized cooling across various device surfaces and geometries, including those geometries wherein cooling media must move against gravity. The benefits of the present system will be appreciated for computer chip and other electronics cooling, microgravity applications, battery thermal management. Beyond thermal management, the underlying system may also open novel avenues in fluid manipulation and energy harvesting.

SUGGESTED USES

- Chip and electronics cooling
- Microgravity applications
- Battery thermal management
- Fluid manipulation or energy harvesting

ADVANTAGES

- Energy-efficient
- Passive, autonomous operation; cooling is locally achieved without external sensing or pumping.
- Flexible implementation: few limitations on topography or geometry; capable of directing cooling against gravity

RELATED MATERIALS

CONTACT

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INVENTORS

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OTHER INFORMATION

CATEGORIZED AS

- **Engineering**
  - Engineering
  - Other
  - Robotics and Automation
- **Computer**
  - Hardware
  - Other
- **Energy**
  - Other
  - Storage/Battery
- **Environment**
  - Other
- **Materials & Chemicals**
  - Composites
  - Electronics Packaging
  - Nanomaterials
  - Other
  - Storage
  - Thin Films
- **Nanotechnology**

- » Electronics
- » Materials
- » Other
- » Tools and Devices

» **Research Tools**

- » Other

» **Semiconductors**

- » Assembly and Packaging
- » Design and Fabrication
- » Materials
- » Other

» **Sensors & Instrumentation**

- » Other

RELATED CASES

2025-073-0

ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

▶ Dust Repellent Surfaces

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