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# Joule Heating-Assisted Membrane Humidity Pump for Confined Space Humidity Control

**A joule heating-assisted humidity pump uses selective membranes to actively remove moisture from electronics enclosures and confined spaces, achieving 50-60% energy savings over traditional methods.**

Researchers at Purdue University have developed a system to dehumidify small spaces or electronics enclosures using a joule heating-assisted humidity pump. This solution leverages water vapor-selective membranes to eject humidity that could damage electronic devices or other components. This allows for energy savings of 50-60% compared to current state-of-the-art solutions while actively removing humidity rather than only attempting to prevent condensation. This technology can be used to improve the resilience of electronics enclosures where humidity and surface condensation are concerns.

**Technology Validation:** This technology has been validated through analytical modelling of a sample enclosure and membrane testing in an environmental control chamber.

### Advantages

-50-60% energy savings over traditional methods

-Actively removes moisture from system

-Improved resilience of electronic systems to humidity

### Applications

-Electronics enclosures

-Humidity control for confined spaces

**TRL:** 4

### Intellectual Property:

**Technology ID**
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**Category**
Energy & Power Systems/Energy Storage
Materials Science & Nanotechnology/Thermal Management Materials & Solutions

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