

# A Brayton Electrochemical Refrigerator/Air-Conditioner

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## **Current cooling methods have high global warming potential burdens**

Conventional vapor compression refrigeration is the most common form of cooling used for air-conditioning within buildings and transportation. Although vapor compression refrigeration is an effective system, these systems use hydrochlorofluorocarbons (HFCs), which have high global warming potentials and are called to be phased through the Kigali amendment to the Montreal Protocol.

Researchers at the Georgia Institute of Technology are developing a new a method of cooling that lessens global warming potential burden by using electrochemistry instead of harmful HCFCs, improving safety and efficiency.

## **Brayton Electrochemical Cooling provides a safe and efficient solution to cooling methods with high global warming burden potentials**

The invention is a new, electrochemistry-based method of highly efficient cooling. Based on the Brayton cycle, the process provides continuous cooling while using electrolytes to repeatedly charge and discharge the electrochemical flow cells. Heat is absorbed and discarded in two heat exchangers, enabling split cooling and heat rejection functionality.

### **Summary Bullets**

- The Brayton Electrochemical Refrigerator/AC is a new, electrochemistry-based method of highly efficient cooling.
- Based on the Brayton cycle, the process provides continuous cooling while also providing near-zero global warming potential (GWP) refrigeration.
- This technology is highly efficient with a measured coefficient of performance that exceeds 8 as well as a non-flammable and non-toxic technology.

### **Solution Advantages**

- Provides near-zero global warming potential (GWP) refrigeration.
- Highly efficient technology with a measured coefficient of performance that exceeds 8.
- Non-flammable and non-toxic technology.

#### Potential Commercial Applications

- Space cooling/heating
- Refrigeration; domestic & commercial use
- Automotive, air & space
- Air-conditioning
- Dehumidification

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#### IP Status

<p>The following patent application has published.</p>: WO2022/216917

#### Publications

[Continuous electrochemical refrigeration based on the Brayton cycle](#), Nat Energy 7, 320–328 (2022) - 2022

#### Images

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