# Non-Aqueous 2D Material-Based Hydrogen Isotope Separation

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**A proton conductor coupled to 2D material exhibit a more efficient hydrogen pump for isotope separation**

Inventors at Georgia Tech describe the design and methods for production of an ion selective hydrogen pump using solid state proton conductors coated with 2D materials (graphene and hBN).

**Summary Bullets**

- **Increased efficiency** - reduction of mechanical issues found in existing proton conductors
- **Increased performance** - solid state proton conductor is rigid eliminating concern of flexibility of polymer membranes in existing devices

Solution Advantages

- **Increased efficiency** - reduction of mechanical issues found in existing proton conductors
- **Increased performance** - solid state proton conductor is rigid eliminating concern of flexibility of polymer membranes in existing devices

Potential Commercial Applications

- Nuclear Energy Applications
  - Enrichment Cascades
- Research Applications
  - Beam Production Capability

Background and More Information

Isotope separation is the process of removing excess ions to identify a concentration of specific isotopes. Currently, 2D materials have been shown to exhibit ion selectivity when operated as a simple hydrogen pump. However, delivery of the hydrogen to the 2D material is of critical importance to a functioning device with adequate efficiency. Importantly, the conductivity of unique nuclei across the 2D material is significantly higher than that of atoms or molecules. For this reason, a proton conductor must be coupled to the 2D material to fabricate a functioning device.

## Inventors


- Dr. Eric Vogel
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- Katie Young
  Graduate Research Assistant


## IP Status

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## Publications

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## Images

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