

Electric Field-Assisted Nanofiltration

Per- and polyfluoroalkyl substances (PFAS), commonly known as "forever chemicals", pose significant risk to the environment and human health even at low levels. Despite this risk, PFAS have become a widespread trace contaminant of tap water while also being highly resistant to destruction. To address the need to safely remove and destroy these chemicals, researchers at Purdue University have developed an electric field-assisted nanofiltration approach. By using a nanofiltration membrane close to a reactive anode, PFAS in a flow can be concentrated and destroyed, while maintaining high flow rates. Testing of Purdue's approach demonstrated the ability to remove and destroy 97% of perfluorooctanoic acid (PFOA), a common PFAS, in a sample flowing at a rate of 68.4 L/m²-hr, while requiring orders of magnitude less electrical energy. This technology has applications in domestic water filtration and municipal and industrial, large-scale water treatment facilities.

Advantages

- Significantly increased removal & destruction of PFAS
- Suitable for home usage or on a utility-scale
- Requires orders of magnitude less energy than alternatives

Applications

- Water Filtration
- Green Technology

Technology Validation:

This technology has been validated through experimental testing, where researchers were able to achieve removal of 97% of PFOA using 30 V to generate an electric field. Filtration alone was limited to 45% removal.

TRL: 6

Technology ID

2024-JI-70364

Category

GreenTech/Water & Resource
Management
GreenTech/Environmental
Remediation & Pollution Control

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Intellectual Property:

Provisional-Patent, 2024-01-18, United States

Utility Patent, 2025-01-20, United States

Keywords: PFAS removal technology, Electric field-assisted nanofiltration, Forever chemical destruction, Advanced water treatment, PFOA elimination system, Low-energy water purification, Reactive membrane filtration, Industrial water decontamination, Green municipal filtration, Home PFAS filtration solution