UNIVERSITY OF MINNESOTA
Driven to Discover℠

Fixation of nitrogen from renewable resources using non-thermal plasma

A system that fixates nitrogen from air and water to produce nitrate-rich liquids using non-thermal plasma-assisted catalytic reactions.

IP Status: PCT Pending

Applications

- Liquid nitrogen fertilizer

Technology Overview

The Haber-Bosch industrial process, which produces the majority of nitrogen fertilizers, requires high energy consumption and significantly contributes to carbon emissions. As a result, environmentally friendly and sustainable alternatives to the Haber-Bosch process are in high demand. Researchers at the University of Minnesota have developed a system that fixates nitrogen from air and water to produce nitrate-rich liquids using non-thermal plasma-assisted catalytic reactions. The resultant nitrate-rich liquid has potential to be used as a nitrogen fertilizer for agricultural applications. This innovative system uses renewable resources in an on-demand manner, thereby significantly reducing carbon emissions from production and transportation.

Phase of Development

TRL: 3-4
This system has been demonstrated to produce a lab scale of nitrate-rich liquids.

Desired Partnerships

This technology is now available for:

- License
- Sponsored research
- Co-development

Please contact our office to share your business' needs and learn more.

Researchers

- **Roger Ruan, PhD** Professor, Department of Bioproducts and Biosystems Engineering
- **Paul Chen, PhD** Research Professor, Department of Bioproducts and Biosystems Engineering

Technology ID
2023-089

Category
Engineering & Physical Sciences/Chemicals
Engineering & Physical Sciences/Processes
Engineering & Physical Sciences/Sustainable Technology
Agriculture & Veterinary/Ag Biotechnology

Learn more