

ELECTROLYSIS OF UREA USING GEL ELECTROLYTE

OU ID: #08008

Benefits

- Low temperature, low cost and low power consuming process that is able to manufacture energy.
- Eliminates the release of green house gases in the atmosphere unlike other sewage treatment processes.
- Eliminates safety concerns of the urea electrolysis process associated with using KOH as the electrolyte.
- Efficient storage of released hydrogen in fuel cells, providing a better alternative to using diesel generators.
- Feasibility of operation of the ammonia electrolyte cell using any renewable source of energy.

Inventors

Dr. Gerardine (Gerri) Botte became Russ Professor of Chemical and Biomolecular Engineering in 2009. Botte is the founder director of Ohio University's CEER. Botte has become internationally known for the development of Ammonia Electrolysis and Urea/Urine Electrolysis.

Botte is also an entrepreneur. She is the founder and Chief Technology Officer of E3 Clean Technologies Inc. E3 is a spin-off of Ohio University with the objective of commercializing and deploying Botte's technologies. The company has received international attention regarding its innovative technologies used to clean water as well as diesel and power plant emissions.



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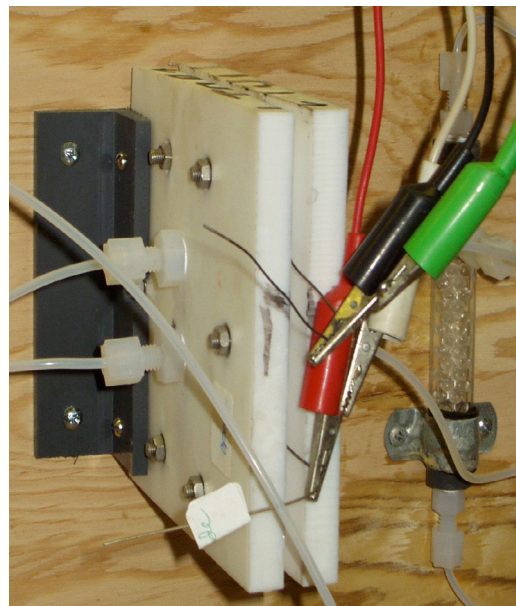
Overview

Urea is a major constituent of human and animal waste. It causes nitrate contamination in the ground and in the sources of drinking water. The technology is a process of removal of urea from wastewater by its electrolysis in an alkali medium. It is a highly cost effective technique as it uses a low cost gel electrolyte as contrasted with the previous techniques that used potassium hydroxide (KOH). The process denitrifies the wastewater along with simultaneously producing hydrogen and ammonia. The effects are further enhanced using an inexpensive nickel catalyst. The gel electrolyte was proven to have high conductivity and a performance comparable to the KOH electrolyte. Previous techniques of urea electrolysis used platinum electrodes and were shown to be ineffective in terms of commercial widespread applications.

The technology is the only available process that is capable of direct conversion of urine into hydrogen and ammonia. It can be efficiently used to create energy from human excreta in mobile units such as military camps. Currently, each of the 200 plus US domestic military camps spends more than \$7 million on energy. Also, conventional sewage remediation techniques cause the release of several million tonnes of green house gases in the atmosphere on an annual basis. The technology would provide an eco-friendly mechanism for these units to drastically reduce their energy spending, in addition to making them self-reliant in terms of energy production.

Commercial Applications

- Mobile energy production
- U.S. military branches



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