



Non-Confidential Description - PSU No. 3179b

"Solid Substrate Microbial Fuel Cells"

Keywords:

microbial fuel cell, anodophilic bacteria, electricity, hydrogen gas

Links:

[Inventor Research Website](#)
[US Patent 8,962,165](#)

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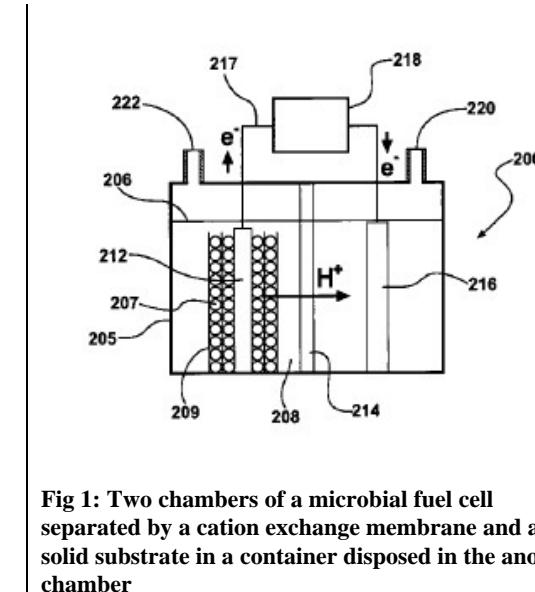


Fig 1: Two chambers of a microbial fuel cell separated by a cation exchange membrane and a solid substrate in a container disposed in the anode chamber

Background

Microbial fuel cells that utilize bacteria as catalysts can be used to make electricity. When modified by removing oxygen and adding a small additional voltage, they can be used to produce hydrogen in a process known as bioelectrochemically assisted microbial reactor. However, certain applications are limited by an inability to provide a bacterial oxidation substrate in required amounts in order to keep the fuel cell operating at a desired level. This current technology describes newly discovered device to optimize the performance of these systems.

Invention Description

The invention relates to microbial fuel cell design improvements for producing electricity or hydrogen from biodegradable organic matter using bacteria as a catalyst. This device utilizes a substrate formulation including a solid biodegradable organic material in a package porous to bacteria. A biodegradable organic substrate supports electron generation and transfer to the anode by anodophilic bacteria, thus increasing the power output. The reactor can be operated as a method of wastewater treatment, or can be used as a method for renewable energy production.

Advantages/Applications

- Utilized in the production of electricity or hydrogen gas
- Utilizes solid biodegradable organic material in a package porous to bacteria
- Increases power output relative to previous sediment microbial fuel cells