Renewable Energy Method for Generating Hydrogen

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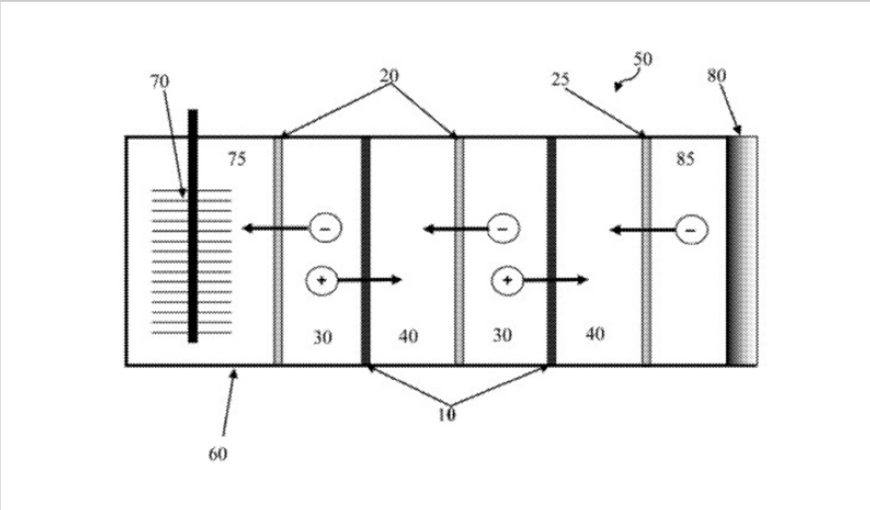

MREC Diagram

Technology Summary

This invention provides a unique method of hydrogen production by integrating a very small (five membrane pairs) reverse electrodialysis (RED) stack into a microbial electrolysis cell, where oxidation of organic matter is driven by exoelectrogenic microorganisms. In this microbial reverse-electrodialysis electrolysis cell (MREC), H2 production is achieved by two driving forces including a thermodynamically favorable oxidation of organic matter by exoelectrogens on the anode, and the energy derived from the salinity gradient between seawater and river water.

Application & Market Utility

This innovation directly achieves hydrogen production in one process without an external voltage supply. This innovation can utilize any salinity gradient to generate H2 from a renewable energy source including domestic and industrial wastewaters, seawater, and river water.

Next Steps

Patent 9,112,217 issued 8/18/2015. Seeking licensing opportunities.

TECHNOLOGY READINESS LEVEL 1-3

Seeking

Investment | Licensing | Research

Keywords

- Microbial electrolysis cell (MEC)
- hydrogen oxidation
- salinity gradient
- MREC
- renewable energy

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