

EXPRESSION OF INTEREST FOR TECHNOLOGY TRANSFER

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Air Breathing Mg-Cu/CuO Fuel Cell

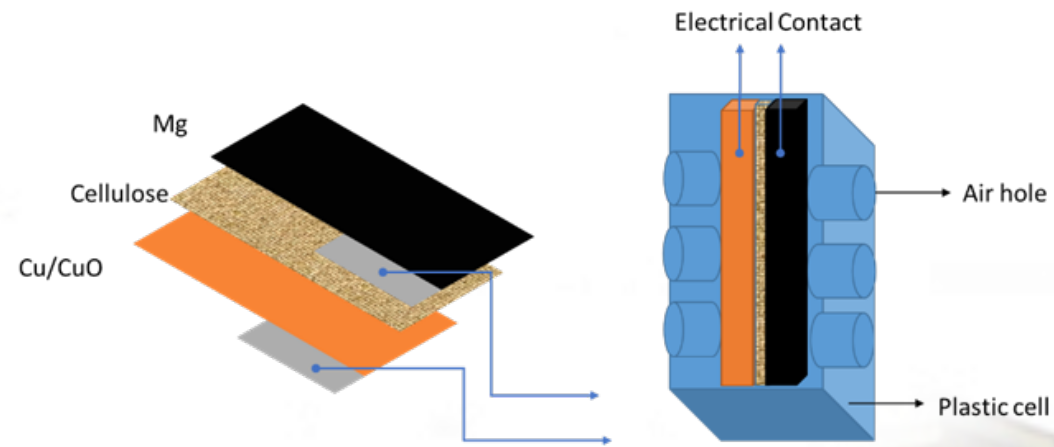
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Patent Application & priority date
/ Patent Number & date of patent: NA

Brief description of the invention (Abstract):

The invention pertains to the development of a fuel cell. The working electrodes of the fuel cell are Magnesium and Cupric oxide. The cell uses saline water as the fuel. Under short circuit conditions the Mg- Cu/CuO fuel cell delivers a maximum current of 0.35 A, and a maximum open circuit voltage of 0.70 V. A power density of $\sim 8 \mu\text{Wcm}^{-2}$ was delivered when operated with 1M NaCl electrolyte.

Graphical abstract:



Novelty of the invention:

We have successfully used an integrated structure of a catalyst and current collector composed of a Cu/CuO hetero-structure to develop a prototype of the fuel cell. Since the catalytic production of hydrogen from NaCl solution (fuel) is a low-cost, high-efficiency process its potential as the electrolyte material in our fuel cell structure has significant novelty.

Utility of the invention:

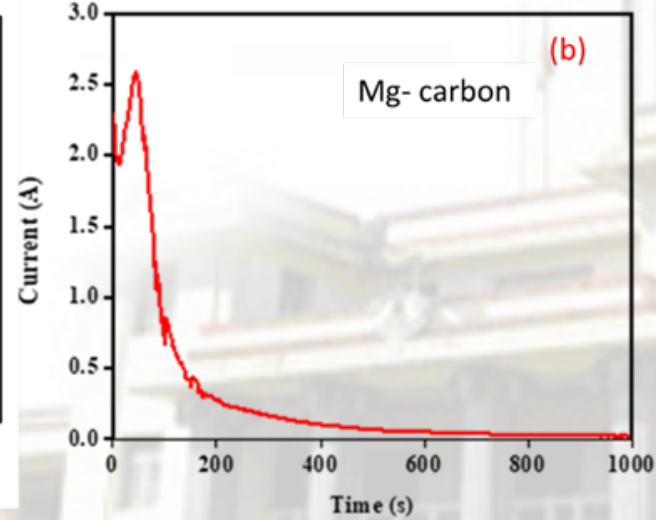
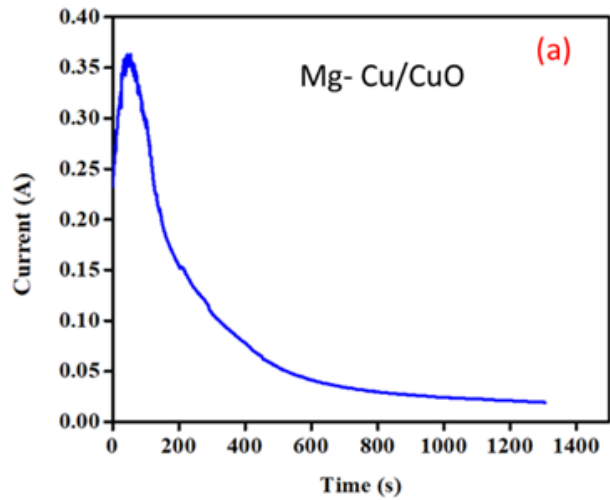
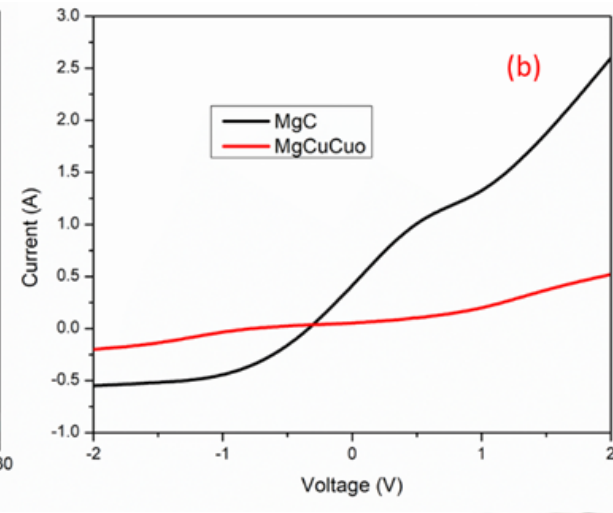
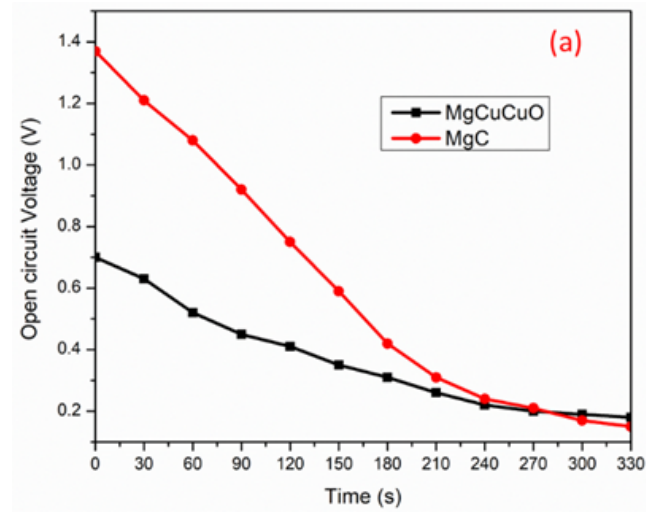
Fuel cells can attain over 80% energy efficiency and are environmentally friendly as they reduce CO₂ and harmful pollutant emissions. They are significantly lighter and more compact than other energy production systems. Fuel cells can be used in a wide range of applications, providing power for applications across multiple sectors, including transportation, industrial/commercial/residential buildings, and long-term energy storage for the grid in reversible systems.

The present invention is in its infant stage and would require ample funding to mature into a commercial product.

Non-obvious nature of the invention:

In the present invention, the use of an integrated structure comprising of the catalyst and current collector layers by the use of a semiconducting layer of CuO grown over Cu substrate in an Mg-NaCl-based fuel cell for improving the kinetics of the oxygen reduction reaction was found to be feasible.

Results:



Fields where the invention finds application:

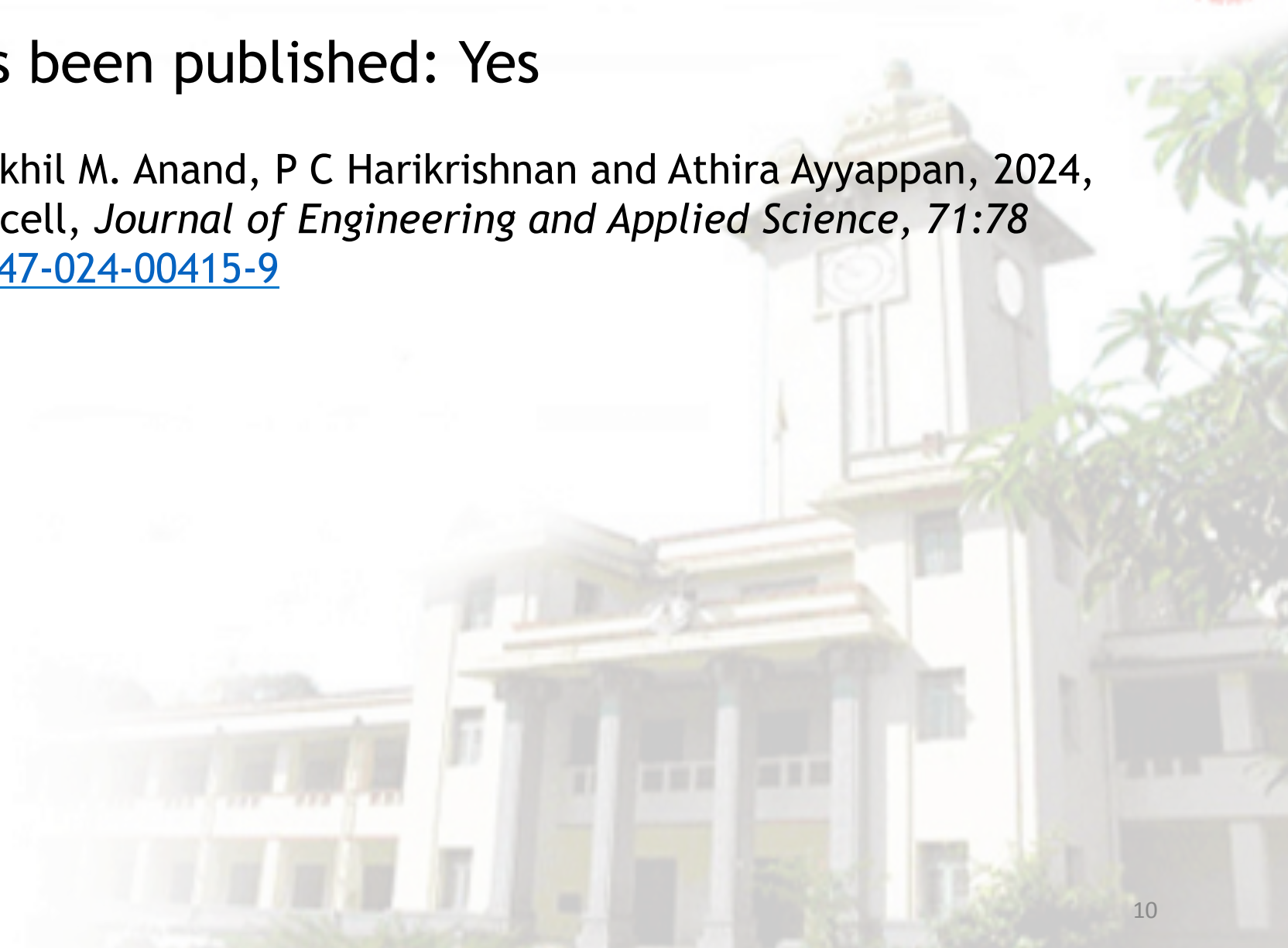
- Energy Harvesting
- Transport
- Biomedical devices



Whether the work has been published: Yes

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