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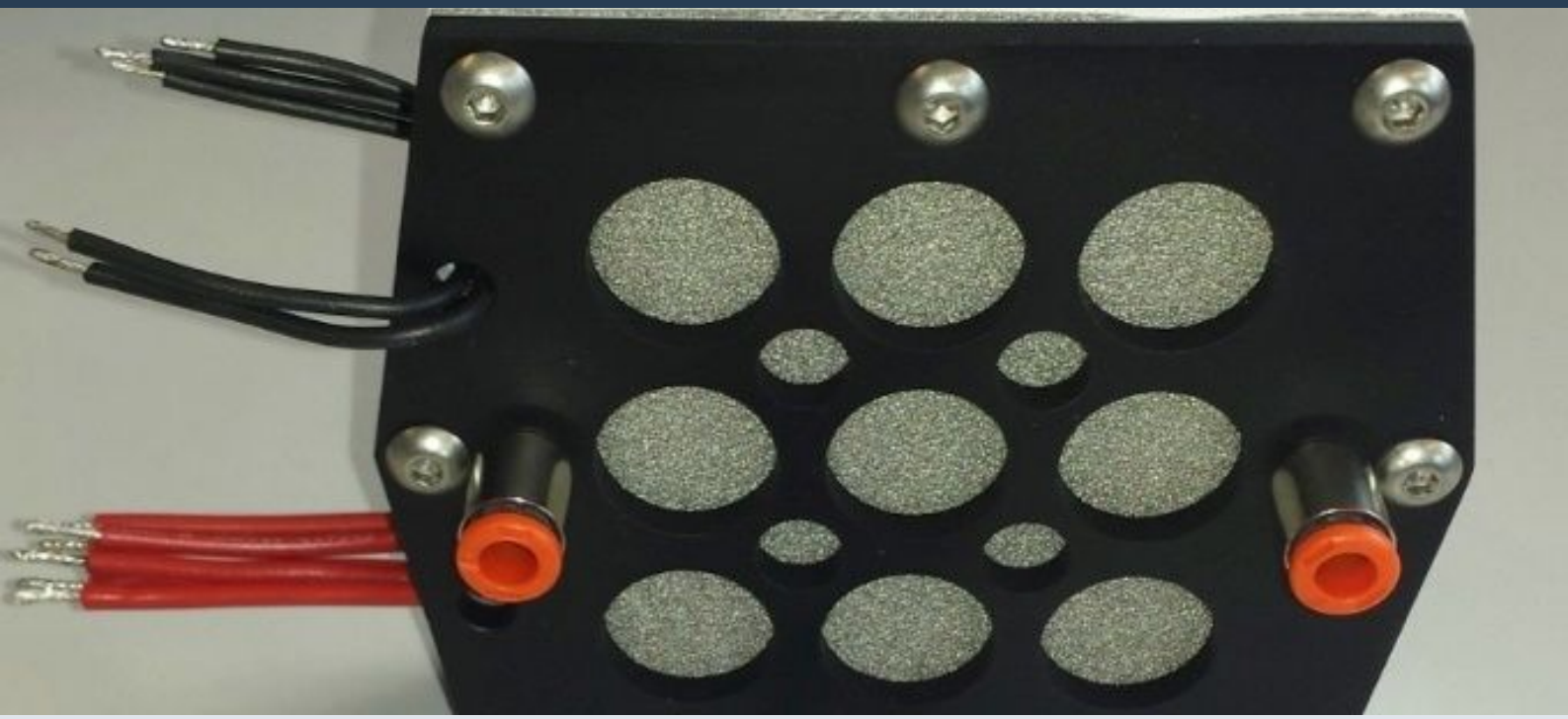
Compact, Light Weight, Fuel Cell Power Module with Reduced Manufacturing Cost (2011/17)

A novel design of a proton exchange membrane fuel cell which overcomes several limitations of existing fuel cell technologies

Reference: Fuel Cell



Header image shows one of the prototype cells. Source: Dublin City University

IP Status

Patented, Patent application submitted

Seeking

Licensing

About **Dublin City University**

Dublin City University (DCU) aims to transform lives and societies through education, research and innovation. Research and Innovation at DCU stems from the academic excellence of its four faculties coupled with a passion for translating knowledge into innovations for economic or societal benefit.

Background

Fuel cells are an attractive source of power for a variety of applications. Fuel cells chemically convert a fuel, such as hydrogen, into electricity in a clean and efficient manner producing benign by-products i.e. water. They typically offer longer operation compared with batteries and do not require re-charging time, as the fuel cartridge/supply is simply replaced. Fuel cells have significant market potential for the high efficiency conversion of fuel to electricity.

Tech Overview

This technology is a novel design of a proton exchange membrane (PEM) fuel cell which overcomes several limitations of existing fuel cell technologies. The design employs a metal foam as a common fluid flow manifold between adjacent fuel cells, which avoids the use of expensive and heavy metal end plates. Conventional fuel cells use graphite end plates, which are bulky, heavy and expensive to manufacture due to the machining requirements. We estimate the DCU design offers 50% weight reduction, 30% size reduction and 10% cost reduction compared with existing fuel cell stack technologies. The design also offers significant advantages in its ease of manufacture.

Figure 1: 5W & 150W Prototype Cells

Benefits

- Smaller and lighter compared with conventional designs
- Easier and less expensive to produce with no machining, main components are formed or stamped
- Enhanced water and heat management
- Enhanced cell efficiency

Applications

The technology is scalable for a variety of applications:

- Portable electronic devices
- Power tools
- Automotive and utility vehicles e.g. forklifts
- Domestic or industrial power back-up devices

Opportunity

Functional prototypes have been produced. Further on-going research is investigating enhanced catalyst materials to reduce and/or eliminate the use of expensive platinum.

DCU is seeking licensing partners for this technology

Patents

- Granted US Patent: US 9,444,117
- Pending European patent application: EP13759186.3, Published as: WO2014037494

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Appendix 1

Figure 1: 5W & 150W Prototype Cells