

2nd International Conference on

Battery and Fuel Cell Technology

July 27-28, 2017 | Rome, Italy

The potential of micro-fuel cells to power the pacemaker-A critical assessment on material selection

Arunkumar Jayakumar

Auckland University of Technology, New Zealand

Fuel cells are one of the efficient energy systems which convert the chemical energy of the fuel directly into the electrical energy. The greatest advantage of a fuel cell is its potential to be used for wide range of applications starting from high power vehicles to low power Implantable medical devices (IMDs). IMDs can be classified into two categories namely functional assisted devices and in-vivo measurements devices. Among these two devices, the role of pacemakers is very crucial as they require reliable power. Conventional, pacemakers are powered by lithium-ion batteries that need to be replaced from time to time which result in the increase in cost and complexity as well severe inconvenience to the patients. A glucose fuel cell (GFC) which is a subset of conventional polymer electrolyte membrane fuel cells (using hydrogen or alcohols as fuels) that oxidizes glucose and reduces oxygen to give electric energy. Since, glucose and oxygen are both present and continuously replenished in physiological fluids by the metabolism, this revolutionary approach is theoretically able to provide enough energy along the patient lifetime without any need of battery replacements. However, appropriate material selection is a critical factor in the design of these kind of fuel cells. In the present paper a holistic assessment on various material considering various factors such as bio-compatibility, strength to weight ratio and other desirable characteristics inline to pacemaker design benchmarks are studied.

Biography

Arunkumar Jayakumar is a Research Fellow at Auckland University of Technology, New Zealand. He has 10 years of experience in PEM fuel cell stacks and systems. He has worked with wide range of Ballard's stack namely, Nexa, 1020 ACS and 1310 WCS. His research activities include PEM fuel cell stacks and systems, sensor, electric vehicles, material characterization and hydrogen energy. His research is currently funded by the IBTec, AUT. He is a member of the IPENZ, IEEE and ASME.

arunkumar.jayakumar@aut.ac.nz

Notes: