



**“Gheorghe Asachi” Technical University of Iasi, Romania**



---

## **A BRIEF REVIEW ON RECENT ADVANCES IN AIR-CATHODE MICROBIAL FUEL CELLS**

**Pritha Chatterjee<sup>1</sup>, Makarand Madhao Ghangrekar<sup>1\*</sup>, Donal Leech<sup>2</sup>**

<sup>1</sup>*Department of Civil Engineering, Indian Institute of Technology, Kharagpur – 721302, India*

<sup>2</sup>*School of Chemistry, National University of Ireland Galway, University Road, Galway, Ireland*

---

### **Abstract**

The performance of cathode affects the overall performance of a microbial fuel cell (MFC), and cathode configuration affects the fabrication cost of this bioelectrochemical system in a large way. Various modifications in cathode structures have been observed in MFCs. Among them air-cathode MFCs are considered to be the most efficient and sustainable option due to elimination of aeration, as required in aqueous cathodes which consumes energy and increases operating cost of MFCs. An air cathode usually consists of (a) a conductive base material, (b) current collectors, (c) catalyst layer, (d) binder layer, and (e) diffusion layer. In this article the recent advances made in fabrication of air-cathode MFC are reviewed. The advantages and disadvantages of different materials used for preparation of an air-cathode are analyzed. On-field application of MFC is limited even after a decade of extensive research. This article also presents the challenges incurred in scaling-up of an MFC for real field application. In addition, this review will assist to realize the advantages and disadvantages of different materials used in construction of air-cathodes. This knowledge will help in intelligent selection of materials for fabrication of air-cathode MFC in future and will further aid to achieve a competitive technology for electricity harvesting while treating wastewater.

*Key words:* air-cathode, binder, catalyst, current collector, microbial fuel cell

*Received: January, 2014; Revised final: July, 2014; Accepted: September, 2014; Published in final edited form: July 2018*

---

---

\* Author to whom all correspondence should be addressed: e-mail: [E-mail: ghangrekar@civil.iitkgp.ac.in](mailto:E-mail: ghangrekar@civil.iitkgp.ac.in); Phone: +91-3222-283440; Fax: +91-3222-282254