

Artificial gills for robots: underwater energy autonomy with MFCs

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Abstract

This paper reports on the first stage in developing microbial fuel cells (MFCs) which can operate underwater by utilizing dissolved oxygen. In this context, the cathodic half-cell is likened to an artificial gill. Such an underwater power generator has obvious potential for autonomous underwater robots. The electrical power from these devices increased proportionately both with water flow rate and temperature. A power increase of 175% was recorded for a corresponding temperature increase (ΔT) of 37°C. Similarly, a power increase ranging from 75-100% was observed as a result of doubling the water flow rate. Both these findings can be advantageous in the design of underwater autonomous robots.