

# 2018 年臺灣國際科學展覽會 優勝作品專輯

作品編號	180018
參展科別	地球與環境科學
作品名稱	<b>Microbial Film Power Generation 2.0</b> <b>- It's about to get cooler</b>
得獎獎項	三等獎
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## Abstract

This study demonstrates that microbial film power generation is a potentially viable source of alternative energy. This research occurred over a period of two years. In the first year (2016) I tested a new method of generating renewable energy, referred to as microbial film power generation. I showed that electricity could be captured from microbial decomposition using solid graphite plates (29cm x 20cm) placed in lightly decomposed muskeg (collected in northern British Columbia).

In the second year (2017) the purpose was to increase the power output of the fuel cell, while also compacting the setup. Certain changes were made to the experimental set up, namely the use of spongy graphite felt in place of solid graphite plates, thus providing a larger surface area for microbial activity to occur. The new fuel cells made produced about twice as much power. Not only was the power output greater, but it was produced from a much smaller area:  $7.82 \text{ mWh/cm}^2$  on graphite felt, compared to  $0.21 \text{ mWh/cm}^2$  on graphite plates. In other words, graphite felt produced 37 times more power per unit area than graphite plates. Furthermore, it would appear that by removing the load from the fuel cell for approximately 24 hours, the fuel cell could essentially recharge. This may be due to microbial activity releasing more electrons onto the anode permitting a new cycle to take place. This would suggest that the system could naturally recharge itself.

## 【評語】 180018

The Experiment explores a novel biological process of generating electricity. The design is good and the findings are interesting and use ful in terms of the understanding of the processes. The author's understanding about the relevant energy flow, as the target physical quantity in this experiment, is somewhat insufficient and execution of the experiment by the sole author is commendable.