Utilizing Metallic Sponges for Microbial Fuel Cell with Organic Molecules

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MFC (microbial fuel cell) has been widely known for its eco-friendliness, and can replace conventional electricity produced using burning fossil fuels. However, the high cost of production hampered fast commercialization. In this study, metallic scrub sponges with high surface active area was used instead of graphite as an electrode which resulted in lowering the cost of conventional MFC production dramatically. Another breakthrough was made through capturing electrons from microbes present in soils where plants such as Buxus microphylla, Zea mays (maize), Glycine max (L.) Merril grow, whereas most of traditional MFC models usually harvest electrons from microbes in wastewater. By installing cathodic glassy carbon electrode and anodic metallic scrub sponge directly into the soil, electricity could be generated. The voltage decreased as the distance between electrodes increased, while the voltage increased with respect to the electrode surface area. This research is innovative in that wide commercialization of MFC can potentially be made by lowering the production cost. In addition, our MFC employs the plants commonly used in farming or gardening. We believe that our research proposes a novel alternative to the fossil fuel as the electricity can be produced in cleaner, and more efficient way.