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(54) **Title:** MICROBIAL FUEL CELL

(57) **Abstract:** Disclosed is a high surface area electrode for use in a microbial fuel cell. In one embodiment the high surface area electrode has an electrode backing and villiated extensions attached to the backing. In one embodiment the villiated extensions and/or electrode backing are made of an electroconductive material such as, for example, graphite or graphite fibers. In one embodiment the electrode is an anode and the electrode backing is in the form of a mesh or woven structure. The electrodes offer superior removal of chemical oxygen demand (COD) and are thus useful in the remediation of wastewaters. The invention also provides microbial fuel cells that utilize the electrodes of the invention. In one embodiment the microbial fuel cells utilize an oxygen barrier and do not utilize a cation or anion or proton exchange membrane.

