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Title:	Low-cost stainless-steel wool anodes modified with polyaniline and polypyrrole for high-performance microbial fuel cells
Authors:	Patil, Sunil A. (/jspui/browse?type=author&value=Patil%2C+Sunil+A.)
Keywords:	Microbial fuel cells Stainless steel wool Polyaniline Power density
Issue Date:	2018
Citation:	Journal of Power Sources, 379, pp. 103-114
Abstract:	A conducting polymer coated stainless-steel wool (SS-W) is proposed for use as a low-cost anode for microbial fuel cells (MFCs). When coated with polyaniline (PANI) and polypyrrole (PPy), the pristine SS-W, SS/PANI-W and SS/PPy-W anodes produced maximum current densities of $0.30 \pm 0.04$ , $0.67 \pm 0.05$ , $0.56 \pm 0.07$ mA cm <sup>-2</sup> , respectively, in air-cathode MFCs. Also, based on achieved power density, both SS/PANI-W and SS/PPy-W achieved $0.288 \pm 0.036$ mW cm <sup>-2</sup> and $0.187 \pm 0.017$ mW cm <sup>-2</sup> , respectively, which were superior to $0.127 \pm 0.011$ mW cm <sup>-2</sup> obtained with pristine SS-W. Further, in comparison with SS-P based anodes, all SS-W based anodes gave improved power densities under similar experimental conditions by at least 70%. Moreover, the charge transfer resistance of the SS-W was much lower ( $240 \pm 25$ $\Omega$ cm <sup>-2</sup> ) than for the SS-P ( $3192 \pm 239$ $\Omega$ cm <sup>-2</sup> ). The $j_0$ (apparent) values obtained for SS/PANI-W ( $0.098 \pm 0.007$ mA cm <sup>-2</sup> ) and SS/PPy-W ( $0.036 \pm 0.004$ mA cm <sup>-2</sup> ) anodes were also much higher than that of the pristine SS-W ( $0.020 \pm 0.005$ mA cm <sup>-2</sup> ), as well as than those of all SS-P based anodes. The observed enhancement of the bioelectrocatalytic performances were well supported by physicochemical and electrochemical characterisation.
Description:	Only IISERM authors are available in the record.
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