

Role of tin (IV) oxide as cathodic catalyst on wastewater treatment and bioelectricity generation in a baffled microbial fuel cell

Abstract

Microbial fuel cell (MFC) has attracted extensive attentions over the past decade because it able to treat wastewater and generate bioelectricity concurrently. However, the development of cost-effective cathodic catalysts to enhance the oxygen reduction reaction was vital for practical implementation. The effect of cathodic catalyst of tin (IV) oxide (SnO_2) on the removal of synthetic wastewater and power generation in a baffled MFC was explored. SnO_2 was synthesized using tin (IV) pentahydrate and sodium hydroxide through a hydrothermal method. SnO_2 was characterized using X-ray diffractometer before applied on the carbon plate (CP) to identify the phase composition and crystal structure, respectively. Results indicated that the chemical oxygen demand removal of synthetic wastewater was increased up to 18 % under the presence of SnO_2 . The application of SnO_2 on CP has significantly increased the oxygen reduction reaction reactivity in the cathodic chamber.