

Does it have to be carbon? Metal anodes in microbial fuel cells and related bioelectrochemical systems.

Datenbank

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Deskriptoren

Kupfer; Bakterien; Silber; Anodenmaterial; Graphit; Nickel; Cobalt; Titan; rostfreier Stahl; mikrobielle Brennstoffzelle; Anode; anodischer Strom; Biofilm; antimikrobielle Wirkung

Freie Begriffe

specific conductivity

Abstract

Copper and silver are antimicrobial metals, on whose surface bacteria do not grow. As our paper demonstrates, this commonly reported antimicrobial property does not apply to electrochemically active, electrode respiring bacteria. These bacteria readily colonize the surface of these metals, forming a highly active biofilm. Average anodic current densities of 1.1 mA cm⁻² (silver) and 1.5 mA cm⁻² (copper) are achieved – data that are comparable to that of the benchmark material, graphite (1.0 mA cm⁻²). Beside the above metals, nickel, cobalt, titanium and stainless steel (SUS 304) were systematically studied towards their suitability as anode materials for microbial fuel cells and related bioelectrochemical systems. The bioelectrochemical data are put in relation to physical data of the materials (specific conductivity, standard potential) and to basic economic considerations. It is concluded that especially copper represents a highly promising anode material, suitable for application in high-performance bioelectrochemical systems.

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