Electric biological coupling process (EBCP) for wastewater treatment: a general review

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ABSTRACT

It is well known that individual classical wastewater treatment techniques (e.g. activated sludge process, anodic oxidation, etc.) are generally inadequate for the removal of hazardous substances from integrated urban wastewater. Therefore, electric biological coupling process (EBCP) has been proposed in order to ensure the effective removal of these pollutants, as each of its constituent techniques supplements the advantages and overcomes the challenges of the other. This paper presents a comprehensive review of the development and application of this process, summarizing the concept, design and operating principle of EBCP system. Various electrode materials used in an EBCP reactor are systematically introduced, including anode and cathode materials as well as particle electrode materials. The effects of important operating parameters, such as current density, cell voltage, dissolved oxygen concentration, pH values and influent loading are discussed. Their applications in treating various types of wastewater are thoroughly reviewed. Finally, perspectives are also proposed on the future trends in the development of the technology. This long-expected overview aims to draw attention to the innovative process, promote its application and development as well as bring the scientific community up-to-date with the latest advances in the field.

Keywords: Electrochemistry; Biological treatment; Electric biological coupling technology; Coupling mechanism; Electrode material; Space structure

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