

Anais

XXIV Simpósio Brasileiro de
**ELETROQUÍMICA &
ELETROANALÍTICA**



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THE ELECTROCHEMICAL GENERATION OF CHLORINE DIOXIDE FOR USE IN ENVIRONMENTAL REMEDIATION

Resumo: Although chlorine dioxide is widely applied in water treatment stations, where it is produced chemically by combining chlorite with hydrochloric acid [1], its production involves large amounts of products. Thus, in this work an improvement of this process was sought, using a different route for the continuous production of chlorine dioxide, susceptible to being used for effluent remediation. In this production route [2], chlorate and hydrogen peroxide are produced continuously using electrochemical cells specially designed to obtain high efficiencies in these electrochemical processes. During this study, prototypes were used, with appropriate conception and design, manufactured by 3-D printing. The characterization of the cells was performed as a function of fluid dynamics, mass transfer, and production of target compounds. The prototype developed for chlorate production, with an electrode surface of 78.5 cm², was capable of producing up to 1,200 mg h⁻¹ of a chlorate solution with a purity of 50%. On the other hand, the prototype developed for the production of H₂O₂, with an electrode surface area of 10.9 cm², was capable of producing up to 9 mg h⁻¹ with a concentration of up to 70 mg L⁻¹. To verify the viability of using the ClO₂ produced in environmental applications, this oxidant was transferred through an airflow to a gaseous stream where it was added to solutions containing iodine and methomyl. It was obtaining total oxidation of iodine added (2 mol L⁻¹) in 3 hours, and the total removal of methomyl (0.1 mMol L⁻¹) in 1 hour. These results demonstrate that this technology can be applied in environmental remediation, confirming the good perspectives of electrochemical technology mediated by gaseous oxidants using chlorine dioxide for waste remediation.

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