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## Application of the experiment design method to the study of the performance of the electrochlorination cells

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### Abstract

On the one hand, a study of the effects of some parameters on the active chlorine production from sodium chloride aqueous solutions in hypochlorite production electrochemical cells was undertaken. These varying parameters included the following: the ratio of anodic and cathodic surface areas (AA/CA), the inter-electrode distance, and the type of the cathode used. On the other hand, a study of the performance of some electrochemical cells that differ in the type of anode (platinum-coated titanium, ruthenium oxide-coated titanium, and graphite) was realized. By means of "experiment design" method employing a full factorial of  $2^3$ , the effects of the most affecting parameters, the set-up of optimum conditions, and the formation of optimal concentration of active chlorine were assessed. Under the following conditions, a concentration of as high as 65.67 g/L of active chlorine was gained: ruthenium oxide-coated titanium anode (AA = 24 cm<sup>2</sup>); titanium cathode AA/AC = 1.33; inter-electrode distance 0.5 cm; current density 35 A/dm<sup>2</sup>; temperature 20°C; concentration of NaCl aqueous solution 3 M; time 2 h.

*Keywords:* Electrochlorination; Hypochlorite; Water disinfecting; Experiment design

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