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MULTILAYER CAPACITOR AS AN ELECTROCHEMICAL SENSOR FOR MEASURING HYDROGEN PEROXIDE

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Hydrogen peroxide (H_2O_2) is a widely utilized compound in laboratories, serving various purposes such as: an oxidizing agent, a reagent, or a cleaning/disinfecting agent. Unfortunately, the compound exhibits degradation, particularly in highly concentrated solutions, even at low temperatures. Traditional methods for assessing its concentration, such as titration, are time-consuming and require additional reagents.

To address this issue, an electrochemical sensor can be used to measure the concentration of H_2O_2 in solutions. In this study, a multilayer capacitor was employed as the sensing element due to its low cost of manufacturing, small physical size and compatibility with electronic systems.

Chronoamperometric measurements were performed using a three-electrode system, applying a potential of +0.3 V and introducing H_2O_2 concentrations ranging from 0.5 mmol to 5.7 mmol. The acquired chronoamperogram demonstrated distinct changes in the amperometric signal with each addition of H_2O_2.

Using a multilayer capacitor, electrochemical measurements were successfully conducted in the solution. The resulting amperometric signal exhibited a linear dependence on the concentration of H_2O_2, with a determined sensitivity of 3.46E-7 A/mM. This electrochemical sensing approach offers a rapid and efficient means of quantifying H_2O_2 concentrations, presenting a valuable alternative to traditional titration methods.

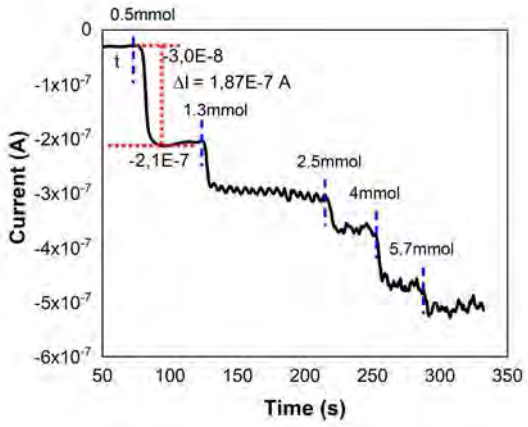

Fig. 1. Chronoamperogram obtained via a multilayer capacitor, +0.3 V in a three-electrode system, signal response from increasing the concentration of H_2O_2 in the electrolyte solution.