

ELECTROCHEMICAL EVALUATION OF POLYANILINE/rGO/Ag FOR THE DETECTION OF GLUCOSE

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The development of sensors based on composites of conductive polymeric materials has been an option that has resulted in a more favorable alternative to other types of sensors such as those based on inorganic materials.

A sensor is a device that records physical, chemical or biological data. changes in a substance and converts them into measurable signals. In other words, the sensor can help researchers explore the composition and content of specific substances in the unknown world, just as humans can look at the colorful world with their eyes (Wang, 2008). In the manufacture of non-enzymatic sensors, a considerable diversity of materials has been used in order to take advantage of the properties of each of them or to cause interactions between them that favor detection. Among other materials we can mention: metals, carbon materials, polymers, oxides, etc. The construction of sensors for glucose detection presents several alternatives, one of which is the electrodeposition of materials on an electrode. Regarding t a PANI + rGO + Ag composite firstly polyaniline (PANI), as it has conjugated bonds in its structure, belongs to this group of conductive polymers. The properties of PANI, such as its chemical stability and its structural resistance in acid and alkaline solutions without undergoing any chemical degradation reaction, favor its use for various purposes (Stejskal, 2010). The limitation that has prevented the use of PANI from being more extensive is the poor processability that this polymer presents, in such a way that the manufacture of any material originated or derived from PANI represents to a certain extent an impossibility. A number of approaches have been developed to reduce the aforementioned drawbacks, such as redoping with functionalized organic acids, copolymerization with PANI derivatives or with other polymers, and preparation of blends and nanocomposites with various materials (Moghadam 2010). Reduced graphene oxide (rGO) is obtained by reducing GO (known as graphene oxide), which can be achieved with chemical methods (using ascorbic acid, hydrazine, among others) or by electrochemical methods using electrolytes such as H₂SO₄ or KOH is a process by which the functional groups produced in obtaining GO are eliminated, making the material more conductive. The method of obtaining rGO is decisive in the properties of the material obtained, the electron transfer that rGO can carry out depends on its morphology and density of defects present (Zhang et al., 2016). The property of being a very convenient material for electron transfer means that very varied uses have been studied for rGO. The characteristics that make nanoparticles offer such diverse applications is that although they retain some properties identical to those of their precursor materials, when subjected to a decrease in size (generally in the range of 1 to 100 nm) they can present properties different and even properties that were not present in the source material. Many approaches and methods have evolved for the effective synthesis of silver nanoparticles, including physical, chemical and biological techniques.

This document presents the work and tests to manufacture a ternary composite (PANI/rGO/Ag) which will be used for the measurement of glucose concentrations. For this purpose, materials were prepared under different conditions and subsequently evaluated with different glucose concentrations.

Keywords: Polyaniline, Electropolymerization, Composite

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