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Preparation novel composite of graphene oxide/ionic liquid / acetone extracted propolis and its application in biosensors

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Abstract: carbon nanomaterial-ionic liquid hybrids represent a very interesting class of materials because of their unique properties that arising from the synergistic combination of both component. it can exploited as elements of electrochemical and support for catalysis. Owing to specific interaction between ionic liquids (ILs) and carbon nanomaterial, the surface properties can be modified leading to their improved dispersion in various media. Since the discovery of bucky gel, the role of ionic liquid on surface modification of carbon materials have been studied. In this article synthesis of graphene oxide and ionic liquid hybrid is investigated. Also their interaction analysis and role of ionic liquid in exfoliation of its sheets and dispersion have been studied. Duty to properties of this hybrid, its application in biosensors is analysed. In case of application in biosensor, we used propolis as a green membrane. prepation GO/IL /AEP (acetone extracted propolis) composite as a novel support and analysing its conductivity with cyclic voltammetry method is the key part of this article.

Keywords: graphene oxide, ionic liquid, acetone extracted propolis, biosensor

1. INTRODUCTION

The discovery of carbon nanomaterial (CNT, GO, ...) has boosted intensive research, which has produced remarkable scientific and technological advances in development of nanostructured materials. Graphene as novel carbon-based nanomaterial has aroused considerable interest due to its potential application in various field [1]. Graphene oxide (GO) contains a wide range of oxygen functional groups both on the basal planes and at the edges of GO sheet [2]. The reactive oxygen functional groups of GO, including hydroxyl, epoxy, and carboxylic acid groups, are very suitable for nanoparticles loading. Go has been successfully employed in bio- electrochemistry [3].

Over the last two decades, a great number of research activities have been devoted to their potential application for energy storage and conversion devices, props and sensors. However, development of new efficient methods to disperse carbon nanomaterial is of fundamental importance to improve the properties of resulting materials. In this respect, ionic liquids emerge as an alternative material for well dispersed and modified carbon nanomaterial. Ionic liquid are low melting salts composed of two asymmetrical ions of opposite charges that loosely fit together. They are non-volatile and non-flammable with great conductivity, high thermal stability, low toxicity, and good solubility. Due to their electrochemical stability, wide potential window, and biocompatibility are used in electrochemical sensors as a green and designer solvent [4, 5]. Fig 1