DISPERSION BEHAVIOR OF GRAPHENE OXIDE IN ORGANIC SOLVENTS (ALCOHOLS)

NURULSYAHIBAH BINTI CHE MAN

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FACULTY OF CHEMICAL ENGINEERING

UNIVERSITI TEKNOLOGI MARA

SHAH ALAM

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ABSTRACT

Graphene is considered unique material promising for a range of new practical application for electronic, mechanical and electrochemical. In this work, the graphene oxide (GO) was prepared by modified Hummer's method. The Scanning Electron Microscope (SEM) images demonstrate ultrathin and the successful GO sheet exfoliated from graphite containing ordered stacking graphene layers. The dispersion behavior of graphene oxide (GO) has been investigated in a wide range of organic solvent. Here in this report, the dispersion of GO has been investigated in three different solvents namely Water, Methanol and Ethanol. The method used for dispersion is ultra-sonication. The effect of sonication time on dispersion behavior was also investigated. GO dispersion in water at 2hr sonication had formed homogeneous and sustainable dispersions compare to the other two solvent, methanol and ethanol. Estimation of the capability of the solvent to disperse the GO used UV-vis adsorption spectroscopy and the spectra are plotted in the wavelength range from 200 to 1000 nm. A stable dispersion remained only in water after 1 week. GO dispersion in methanol and ethanol settled after few times of sonication.

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CHAPTER 1

INTRODUCTION

1.1 Research Background

Graphene has unique 2D surface with flat hexagonal structure. Its 2D surface make it as unique host of electronic properties which not seen in other thicker carbon films or carbon monostructure (Quintana et al., 2013). Graphene is an atom with a thin layer of sp2-bonded carbon atoms, stacked in a two-dimensional (2D) honey comb lattice, forming the basic building block of carbon allotropes of any dimensionality (Geim et al., 2007)

It is discovered in 2004, graphene has been remarkable properties attracted a tremendous attention worldwide from the fundamental, applied science and also electrochemical community. Graphene known as the thinnest materials and become the strongest ever measured for thermal conductivity and stiffness. Besides, graphene has the right proportional between brittleness and ductility and also it's permeable to gases (Quintana et al., 2013). Graphene is excellently used in electronic, mechanical, optical and thermal properties (Dang et al., 2012).

Graphene oxide (GO) also can act as support in enzyme immobilization. GO is nanoparticle material that provides higher enzyme stability and enhance catalytic activity (Patel, Gajera, Gupta, Manocha, & Madamwar, 2015). Besides that, GO have large surface area that enriched with oxygen-containing group that make it possible for enzyme immobilization.