UNIVERSITI TEKNOLOGI MARA

INVESTIGATION OF DIFFERENT DEGREE OXIDATION ON PHYSICAL AND CONDUCTIVITY PROPERTIES OF GRAPHENE OXIDE VIA MODIFIED HUMMERS METHOD

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AUTHOR'S DECLARATION

I declare that the work in this thesis was carried out in accordance with the regulations of Universiti Teknologi MARA. It is original and is the results of my own work, unless otherwise indicated or acknowledged as referenced work. This thesis has not been submitted to any other academic institution or non-academic institution for any degree or qualification.

I, hereby, acknowledge that I have been supplied with the Academic Rules and Regulations for Post Graduate, Universiti Teknologi MARA, regulating the conduct of my study and research.

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ABSTRACT

Graphene oxide (GO) was successfully synthetized from raw graphite powder. By using modified Hummers method, graphene oxide with different degrees of oxidation level was produced. In this paper, the oxidation agent that has been used was potassium permanganate, $KMnO_4$. The various types functional group of oxygen were formed in graphene oxide and their impacts on its structure were analyzed by Fourier transform infra-red (FTIR) spectra, UV-Vis spectra, Semiconductor Parameter Analyzer (SPA) and densimeter testing. FTIR studies showed the bond that presented in the sample were O-H, C=C, C-OH and C-O-C respectively. UV-Vis analysis revealed GO with more $KMnO_4$ shows an increment in absorption and wavenumber due to more concentration of GO and stacked layers of GO. Result from density testing shows that increasing oxidation levels results in a low density of sample. Analysis from SPA revealed, low oxygenated functional group from low level $KMnO_4$, S-1 produced less band gap open and thus, yielding high conductivity. In contrast, high level $KMnO_4$, at S-5 produced high and various oxygenated functional groups caused high band gap opened and thus, resulting in low conductivity.

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