

SYNTHESIS AND CHARACTERIZATION OF
GRAPHENE USING LIQUID PHASE EXFOLIATION

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ABSTRACT

Graphene is a two-dimensional single-layer sheet of sp^2 hybridized carbon atoms has attracted tremendous attention and research interest, owing to its exceptional physical properties, such as high electronic conductivity, good thermal stability, and excellent mechanical strength. There are two categories of method that used in producing graphene which are bottom-up and top-down. In this study, graphene was synthesized using liquid phase exfoliation technique. The exfoliated graphene is synthesized from activated carbon, glycine and dimethylformamide (DMF). The functional groups of the sample was confirmed by Fourier transform infrared spectroscopy equipped with attenuated total reflectance device. From UV-Vis analysis, the resulting exfoliated graphene concentration is 0.154 mg/ml from 0.1 g of activated carbon. The field emission scanning electron microscopy proved that stacking layers of graphene is observed on the exfoliated product.

ABSTRAK

Grafyn ialah karbon dua dimensi dengan satu lapisan hibrid sp^2 telah menarik perhatian dan minat penyelidik kerana ciri-ciri fizikal yang luar biasa seperti kekonduksian elektronik yang tinggi, kestabilan haba dan kekuatan mekanikal yang baik. Terdapat dua kaedah yang boleh digunakan dalam menghasilkan grafyn iaitu *bottom-up* dan *top-down*. Dalam kajian ini, grafyn telah disintesis dengan menggunakan teknik pengelupasan fasa cecair. Pengelupasan grafyn dilakukan dengan menggunakan karbon teraktif, glicina dan dimetilformamida (DMF). Kumpulan berfungsi telah disahkan oleh Jumlah Pantulan Teratenuat-Spektroskopi Inframerah Transformasi Fourier (ATR-FTIR). Daripada analisis UV-Vis, penentusahan grafyn boleh dibuktikan hasil kepekatan sebanyak 0.154 mg/ml daripada 0.1 g karbon teraktif. Seterusnya, dengan menggunakan mikroskop imbasan elektron pancaran medan ia menunjukkan bahawa terdapat susunan lapisan grafyn pada produk pengelupasan.