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A novel synthesis route of graphene via microwave assisted intercalation-exfoliation of graphiteFeng JIANG^{1,2}, Yun YU^{*1}, Yong WANG^{1,2}, Aihu FENG^{1,2}, Lixin SONG^{*1}

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Abstract

This work presents a facile and novel method to fabricate graphene via microwave-assisted NH₃ molecule intercalation-exfoliation of graphite. **Specifically, dibasic ester (DBE) was chosen as the solvent due to its suitable surface energy and nontoxicity.** The microstructure of as-prepared samples was characterized by Transmission electron microscopy, Raman spectrometry, and Field emission scanning electron microscopy. The mechanism of above-mentioned method was preliminarily investigated. The results show that the size of as-prepared graphene is larger than 3 μm with few-layer structure. Microwave radiation can increase both the disorder degree and interplanar distance of graphite, which makes small molecule ammonia easily exfoliate graphite into graphene. This method is fast, convenient, and low-cost. It opens up a new way to grapheme fabrication.

Key words: Carbon materials; Microstructure; Graphene; Microwave; **Exfoliation**

1 Introduction

Graphene, a monolayer of graphite, has attracted **great** interest due to its **high electrical conductivity, excellent mechanical strength and large specific surface area**^[1,2]. **It has tremendous application potential in catalysis, energy storage devices, gas sensors and electromagnetic interference shielding.**

These years, as the development of linguistic research, **many fabrication methods of grapheme have been widely explored by previous researchers**, including micromechanical cleavage of graphite^[3], epitaxial growth on SiC surfaces^[4], chemical vapor deposition (CVD)^[5], chemical reduction of exfoliated graphite oxide^[6] **and so on. However, each method contains major problems, such as the**

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