

Chemical Synthesis Routes of Graphene

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Abstract

The significance of graphene and its derivatives for clean energy applications became visible over the last few years because of their amazing characteristics, especially electrical, thermal, and chemical properties. We examine the recent progress and some challenges in the syntheses and variation of graphene-based materials, it is important to manufacture high-quality graphene in large manufacture. There are different methods of generating graphene, summarizing the exfoliation of graphene by mechanical, chemical, thermal reduction and chemical vapour deposition.

Keywords: Graphene, Chemical Vapor deposition, Mechanical exfoliation, Reduction graphene (RGO).

3.1.INTRODUCTION

Graphene is an allotrope of carbon that exists as a 2-D planar sheet. One way to think of graphene is as a single atomic graphite layer. Graphene is technically a non-metal but is often referred to as a quasi-metal because of its properties being like that of a semi-conducting metal. It has many unique properties that you don't find with other non-metallic materials. Each carbon atom is covalently bonded (sp^2 hybridized) to three other carbon atoms in a hexagonal array, leaving one free electron per each carbon atom. This free electron exists in a p-orbital that sits above the plane of the material. Each hexagon in the graphene sheet exhibits two pi-electrons, which are delocalized, allowing for efficient conduction of electricity. The holes in the structure also allow phonons to pass through unimpeded, which gives rise to high thermal conductivity. Graphene has many unique properties, Graphene has attracted world-wide attention after its discovery “[1] for its unique structure and many useful properties in