

From Graphite to Graphene – understanding graphite in order to generate great graphene

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The transformation of carbonaceous matter into graphite during metamorphism, a process called graphitization, is a function of the degree of crystallization and metamorphism [1], that promote molecular ordering of graphite unit cells and facilitate preferential control of graphene aromatic lamellae and pore coalescence. As a whole, the Minas-Bahia Province has undergone an intense process of regional metamorphism [2], so it is expected that the graphite crystals have a high crystallinity. Brazil is among the largest producers and holders of reserves of natural graphite of the flake type, being the second largest producer and holding the third largest reserve of this mineral in the world [3]. The Minas-Bahia Graphite Province is located in the extreme northeast of the state of Minas Gerais and south-southeast of the state of Bahia [2]. There is a great lack of studies regarding the relationship between the final product, graphene, and the raw material in its geological environment, graphite, although there are potential differences between graphite ores that make them respond in different ways to processes exfoliation for graphene production [4]. Through detailed mineralogical and physical analysis of different graphite ores [5] differences in temperature and degree of crystallization were observed for the Province, where the temperatures calculated in the by XRD (graphite crystals) and by electron microprobe (mineralization host rocks) indicate temperatures varying between 563.95°C and 857.61°C for graphites and from 705°C to 917°C for the host rocks. Also, the region passed through intense partial melting processes, which occasioned differences in crystallization degree, C source and habit at SEM. Furthermore, the different types of ores also show different associations of impurities included in the graphite flakes. [5] [6]. Which makes the province the best place to study the influence of the type of graphite on the graphene equivalent and seek to understand the benefits and advantages that we can have in graphene through these differences in the carbon source, crystallization temperature and impurities of the graphite crystal.

References

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