Geological Attributes of Graphite and its Importance in Material Science in the 21st Century

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Abstract

The 21st century is very well known as the carbon age, where we see all forms of carbon in different compounds, both harmful and useful to the society. There are four known allotropes of carbon: amorphous, graphite, diamond and fullerene. Graphite, the middle siblings of the carbon family, possessing neither the brilliance of diamond nor the thermal producing capabilities of coal, has made its mark on the 21st Century. Graphite is a naturally-occurring form of crystalline carbon. It is a native element mineral recognized as components of metamorphic rocks and in some igneous rocks. Graphite is formed due to the metamorphism of fine-grained dispersed carbonaceous material during the progressive graphitization process. New materials built on the many allotropes of carbon will function as the base-building blocks for a host of solutions including cleaner batteries, cleaner water, and cleaner air that will benefit our society, our economies, and our planet. Thus, in response to a number of green energy initiatives, the role of graphite has considerably increased. These include lithium-ion batteries, fuel cells, solar energy, semi-conductors, nuclear energy and many more where the demand for graphite has considerably increased. As the research deepens, the new materials from graphite are constantly being identified, making it a key mineral in material science in the carbon age in this 21st Century. Keeping a view on the demand positions of graphite, exploration of graphite and carbon bearing material in nature has been substantially highlighted by understanding the geological complexities and targeting the key horizons in nature to meet the requirement.

Key words: Graphitisation, Graphite, sustainable use, green energy