



THE RELATIONSHIP BETWEEN THE CARBON AND ELEMENTS COMPOUNDS OF ITS ROW

Sawsan El. Sir
Awad Mohammed

University of Khartoum, faculty of science, department of chemistry

Dr. Salah Elnaiem
Mohammed*

University of Khartoum, faculty of science, department of chemistry *Corresponding Author

ABSTRACT Hexagonal boron nitride (h-BN) is attracting considerable attention for two main reasons, The hexagonal boron nitride is a layered material similar to graphite. It is composed of sp^2 covalently bonded atoms in a honeycomb arrangement within each layer and therefore is iso-structural to graphene. As these layers are held together by weak van der Waals interaction. Also Hexagonal boron nitride (BN): A material structurally closely related to graphite, has an attractive combination of chemical, thermal and electrical properties. The utility of activated carbon suggests that an analogous activated BN exhibiting a high degree of porosity and an extended interparticulate surface area might be of scientific and economic importance.

KEYWORDS :

1-INTRODUCTION :-

- Carbon (form Latin = carbon1"coal") belongs to 14 of the periodic table⁽¹⁾. Three isotopes occur naturally C^{12} and C^{13} being stable while C^{14} is a radionuclide, decaying with a half-life of about 5,730 years⁽²⁾.

Main isotopes of carbon:-

Isotope	Abundance	Half life ($t_{1/2}$)	Decay mode	product
11_C	syn	20 min	β^+	11_B
12_C	98.9%			
13_C	101%			
14_C	trace	5,730 y	β^-	14_N

The atoms of carbon carbon together in different ways, termed allotropes of carbon. The allotropes of carbon **a**) diamond **b**) graphite **c**) Lonsdale **d-f**) fullerenes (C_{60} , C_{540} , C_{70}) **g**) amorphous carbon **h**) carbon nanotube.

Diamond :-

At very high pressure carbon forms the more compact allotrope, having nearly twice the density of graphite, each atom is bonded tetrahedrally to four others, forming a 3-dimensional network of puckered six membered ring of atoms.

Graphene :-

Is a two-dimensional sheet of carbon with atoms arranged in hexagonal lattice. Graphite is a three-dimensional material consisting of layers of graphite molecules stacked like pages. The single layer of graphite molecule is graphene⁽³⁾.

The Amorphous :-

Form is an assortment of carbon atoms in non-crystalline, irregular glassy state, not held in crystalline macro structure. It is present as a powder, and is the main constituent of substances such as charcoal, lamp black (soot) and activated carbon⁽⁴⁾.

Fullerenes :-

Are a synthetic crystalline formation with a graphite-like structure, but in place of flat hexagonal cells only, some of the cells of which fullerenes are formed may be pentagons, nonplanar hexagons, or even heptagons of carbon atoms⁽⁵⁾.

The properties of fullerene (split into bucky balls, bucky tubes and nanobuds). The names fullerene and bucky ball are given after Richard Buckminster Fuller. The best-known and simple is the soccerball-shaped C_{60} .

The boron nitride is notable for the variety of structures that they adopt. They exhibit structures analogous to various allotropes of carbon, including graphite, diamond, and nano tubes. In the diamond-like structure, called cubic boron nitride (trade name Borazon). Boron atoms exist in tetrahedral structure of carbon atoms in diamond, but

one in every four B-N bonds can be viewed as a coordinate covalent bond, where two electrons are donated by the nitrogen atom which acts as the Lewis base to bond to the Lewis acidic boron(III) centre.

In the BN compound analogue of graphite, hexagonal boron nitride (h-BN). The positively charged boron and negatively charged nitrogen atoms in each plane lie adjacent to oppositely charged atoms in the next plane. Consequently, graphite and h-BN have very different properties, although both are lubricants. As these planes slip past each other easily. However, h-BN is a relatively poor electrical and thermal conductor in the planar direction⁽⁶⁾⁽⁷⁾.

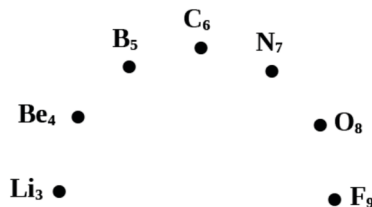
Beryllium oxide (BeO): Also known as beryllia. This colorless solid is a notable electrical insulator with a higher thermal conductivity than any other non-metal⁽⁷⁾. BeO crystallizes in the hexagonal wurtzite structure, featuring tetrahedral Be^{2+} and O^{2-} centers, like lonsdaleite and W-BN (with both of which it is iso-electronic). In contrast the oxides of the larger group-2 metals, i.e. MgO, CaO, SrO, BaO, crystallize in the cubic rock salt motif with octahedral geometry, about the dications and dianions⁽⁷⁾ at high temperature the structure transforms to a tetragonal form⁽⁸⁾.

Lithium fluoride (LiF): It is a colorless solid, that transitions to white with decreasing crystal size. Although odorless, lithium fluoride has a bitter-saline taste. Its structure is analogous to that of sodium chloride, but it is much less soluble in water.

Formation of LiF from the element releases one of the highest energies per mass of reactants, second only to that of BeO.

2- RESULTS:-

Figure :-



-The figure shows the relationship between the carbon and element compounds of its row

4- Recommendations:-

We recommend in-depth study of the carbon cycle elements compounds to be used as an alternative to carbon, thus minimizing carbon dioxide emissions in the air.

5- REFERENCES:-

1) "Carbon / Facts uses and properties" Encyclopedia Britannica.

- 2) "abc" carbon –naturally occurring isotopes" web Elementperiodic table Archivid from the original on 2008-09-08 retrieved 2008-10-09.
- 3) " measurement of the elastic properties and intrinsic strength of mono layer graphene " science. 321 (5887), 385-8.
- 4) " Nano – Engineered spacing in Graphene Sheets For Hydrogen Storage " chemistry of 1)" carbon /Facts uses and properties" Encyclopedia Britannica.
- 5) Clifford, Frondel marvin, Ursula 13. (1967) " Lonsdaleite a new hexagonal polymorph of diamond " Nature 214 (5088) : 587-589.
- 6) Engler, M.(2007) " Hexagonal Boron nitride (h-BN)- Applications from metallurgy to cosmetics " (PDF). Cf / Ber DKG . 84 : D25 ISSN0173-9913.
- 7) Greim, Jochen and Schwetz, Karl A. (2005). " Boron carbide, Boron Nitride, and metal Borides " .
- 8) A.F.Wells(1984)structuralinorganicchemistry(5ed).OxfordScience Publications.