Preprints (www.preprints.org) | NOT PEER-REVIEWED | Posted: 7 January 2018 doi:10.20944/preprints201801.0036.v1

Atomic Structure and Binding of Carbon Atoms

Mubarak Ali

Department of Physics, COMSATS Institute of Information Technology, Islamabad 45550, Pakistan. E-Mail: mubarak74@comsats.edu.pk, mubarak74@mail.com

Abstract –Many studies deal synthesis of carbon materials including all the disclosed states. This study describes the binding mechanism of different state carbon atoms. The binding energy as per gauge of certain state carbon atom is being invited under the application of force. In evolving different structures of carbon atoms their admissible electron-dynamics generate binding energy. Evolution of graphite structure is one-dimensional when certain amalgamated atom executes electron-dynamics to gain stable state to bind atom of attained stable state. Evolution of graphite structure is two-dimensional when amalgamated atoms under attained dynamics deal difference in surface format forces at the point of binding. Structural evolution is two-dimensional for nanotube and four-dimensional for fullerene (bucky balls). Structure evolution of graphite, nanotube and fullerene involve surface format forces mainly to invite binding energy of their atoms as per gauge of electron-dynamics. Structural evolutions of diamond and Lonsdaleite are under the joint application of surface format forces and grounded format forces to invite binding energy of atoms. Structural evolution of graphene involves both surface and space format forces to invite binding energy of atoms. Glassy carbon is related to layered wholly topological structure where layers of gas state carbon atoms, graphitic state and lonsdaleite state are being involved in successive manner to invite binding energy under space, surface and grounded format forces. Due to maintenance of electrons, carbon atoms do not bind when in the gas state. Diamond is south to ground tetra-dimensional, Lonsdaleite is south to ground bi-dimensional and graphene is ground to north tetra-dimensional topological structures. The Mohs hardness of carbon-based materials under different levitation gravitation behaviors attempting at electron level under contraction expansion of clamping energy knot is sketched. Carbon atoms when in fullerene structure is the best model to understand

Preprints (www.preprints.org) | NOT PEER-REVIEWED | Posted: 7 January 2018 doi:10.20944/preprints201801.0036.v1

the influencing force at ground surface and the best model to explain binding mechanism in atoms of other elements.

Keywords: atomic structure; carbon atomic states; atomic binding; glassy carbon

1.0 Introduction

Development of selective size and shape materials and investigating their characteristics at atomic scale requires a new sort of observations. Wherever forces influence the process of structure evolution, energy is being anticipated. Inviting energy under the different sorts of forces existing at different levels may be anticipated in this context. When carbon atoms transform into certain behavior state from gas state, they may undergo for different sorts of attained dynamics and electron-dynamics resulting into evolution of different structures along with their different binding mechanism. Moreover, regulating structure of carbon atoms in certain positions of electron states may deal specific transformation. Additionally, depending on the process conditions and employed technique of the synthesis, carbon atoms might differ in their transformation rate. In hot-filaments deposition system, tiny grains developed prior to go for grains and crystallites switching their morphology-structure with size and shape [1].

Atoms of carbon in different states (allotropic form) have their different history starting from the gas state, graphitic state and diamond state then Lonsdaleite and fullerene following by carbon nanotube and glass carbon and finally graphene.

It is necessary to understand dynamics of tiny particles' formation prior to go for assembling into large size particles [2]. Agglomerations of colloidal matter envisage atoms and molecules to deal them as materials for tomorrow [3]. Formation of different tiny particles have been discussed elsewhere [4]. The formation mechanism of tiny shaped particles under certain concentration of gold precursor has been discussed [5]. Under identical process parameters, the nature of precursor directs tiny shaped particles following by large shaped particles where role of atomic nature is crucial [6]. Different tiny shaped particles were developed under the application of nano shape energy while varying the bipolar pulse and pulse polarity [7]. Formation process of large-sized particles reveals very high development rate [8]. Basis structures of solid atoms under the application of electron-dynamics while in uni-format force of grounded, surface and space have been discussed elsewhere [9]. Formation of monolayer tiny particle in gold under transition state of atoms involving

Preprints (www.preprints.org) | NOT PEER-REVIEWED | Posted: 7 January 2018 doi:10.20944/preprints201801.0036.v1

forces of surface format elongating into structure of smooth elements as discussed elsewhere [10]. Atoms of suitable elements execute electronic transitions don't ionize, deform or elongate while inert gas atoms split under the application of photonic current [11]. The phenomena of heat and photon energy have been discussed while dealing neutral state silicon atom where inter-state electron-dynamics generate forcing energy (photons) characteristic current [12]. Influence of chamber pressure on depositing carbon films under fixed process parameters has been discussed elsewhere [13]. Certain nature atoms of tiny particles deal different behaviors resulting into work either effective nanomedicine or defective [14]. A detailed study has been presented elsewhere [15] where the origin of atoms to be in different states along with force-energy paradigm is discussed. In various NCD/UNCD films where high-resolution microscopic studies conducted, atoms of tiny grains reveal elongation as well as deformation behaviors and it is hard to recognize the atoms in same shape. A film synthesized at few millimeter surface show different trend of analyses. Different analyses techniques indicate different trend of resulted peaks of 'tiny grains carbon films' as discussed elsewhere [16]. Predictor packing in developing particles of unprecedented shapes has been disclosed elsewhere [17]. Again, it has been discussed deposition of both graphitic and diamond state at single substrate in single experiment while employing different level of heat [18].

Atoms of different elements are mainly recognized on the basis of their physical properties; thus, their structure is also considered to base on physical attribute. Carbon atoms deal several physical behaviors despite the fact it is being declared with unique chemical nature. Carbon materials comprised identical state atoms which reveal very different behavior with respect to each other which is being categorized at clear grounds. This indicates that transition of certain electron to nearby available unfilled state within the same ring change the behavior of atom resulting into introduce a new phenomenon. This is also being considered that force behavior along entering (north pole) and leaving (south pole) ground surface is different as compared to force behavior at/near ground surface (east-west poles), which is being observed in everyday life in addition to available fundamental laws and scientific phenomena. This originates that each atom of the nature at its centre deals the axes where transition of any electron under the crossing of north or south pole is prohibited and for which a detail study is given elsewhere [15]. Thus, the

Preprints (www.preprints.org) | NOT PEER-REVIEWED | Posted: 7 January 2018 doi:10.20944/preprints201801.0036.v1

available option for transit electron of filled state to unfilled in all suitable atoms is being considered within left-side when within west pole of the atom and within right-side when within east pole of the atom where centre of each atom is being treated neutral in terms of existing forces as in the case of silicon atom when ready to generate photon characteristic current on using the heat energy. When the ground point of an atom is (just) at above ground surface, it is being dealt in gas state under dominating force of space format, when the ground point of an atom is (just) at below ground surface, it is being dealt in solid state under dominating force of grounded format and evolution of different basis-structures under different force formats is discussed elsewhere [9].

Atomic binding in carbon atoms of different states remained crucial to understand where only partial information of evolution of graphite structure can be extracted. Then atom to atom binding when in the diamond state where at one side, a large crystallite of diamond is growing and on the other side, a single atom of diamond state is depositing to grow that further. Then structural evolution in other forms of carbon atoms along with topological structure where more than one format forces are being involved. Then the binding of layers of different state carbon atoms when being arranged in the certain successive manner. In the present work, atomic structure of different state carbon atoms is pinpointed. This study describes that each designated state of carbon atom is related to its acquired certain positions of electrons within available options of unfilled states where force-energy is responsible to evolve certain structure depending on the occupied position of electrons of outer ring along with difference in ground point.

2.0 Results and discussion

Different states of a carbon atom are shown in Figure 1 (a-g) where changing certain position of electrons within right-side and left-side of north-south poles results into transform a new state of the carbon atom; in Figure 1 (a) a gas state, in Figure 1 (b) graphitic state, in Figure 1 (c) diamond state, in Figure 1 (d) lonsdaleite state, in Figure 1 (e) graphene state, in Figure 1 (f) nanotube state and in Figure 1 (g) fullerene state carbon atom is shown. In the process of changing the position of two electrons for one window (state), one toward the right-side and one toward the left-side under the placement of certain feature energy transported by different means resulting into fill nearby unfilled states where gas state atom is transformed into

Preprints (www.preprints.org) | NOT PEER-REVIEWED | Posted: 7 January 2018 doi:10.20944/preprints201801.0036.v1

graphitic state. In the process of changing the position of all four available electrons of outer ring toward south pole, a carbon atom of diamond state is resulted and different occupied states of electrons of outer ring along with unfilled ones for each different state of carbon is shown in Figure 1. The migrated electrons to attain certain state of carbon atom maintain the state if no additional heat energy under the application of force will be involved. In each state of carbon atom, the availability of four electrons at centre of outer ring as shown in Figure 1 is related to zeroth ring (or helium atom) and termed as the nucleus [15].

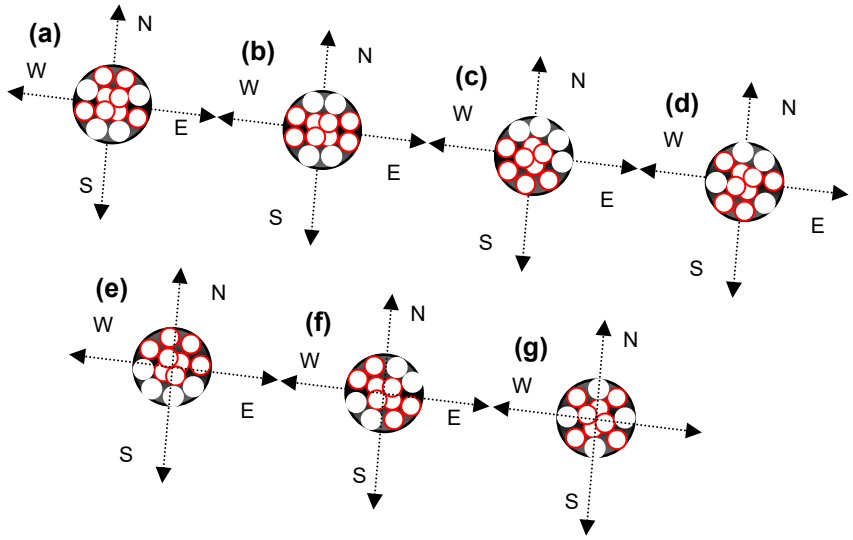

Figure 1: Atomic structure of carbon atom when in (a) gas, (b) graphitic, (c) diamond, (d) Lonsdaleite, (e) graphene, (f) nanotube and (g) fullerene (bucky balls); red color circles denote filled and grey color circles denote unfilled states of electrons

In Figure 2 (a), binding of graphitic state atoms is shown; when one amalgamated atom is already in the graphitic state (atom A) and another atom (atom B) is in the transition state to achieve the graphitic state. At that instant generated energy by the atoms B under the execution of its appropriate electron-dynamics is being used to bind to the clamping energy knot of electron adhered adjacently. While migrating arrowed electron from filled state to nearby unfilled state of carbon atom under the requisite force of surface format its atom is being transformed into graphitic state by generating energy shape like half parabola with slightly turned one end. The slightly turned one end of binding energy is related to force of either space format (under levitation behavior) or grounded format (under gravitation behavior) when electron was migrated from the upward side or downward side, respectively. On binding of atom B to atom A under binding energy shape like half parabola with slightly turned one end, they gained stable (or neutral) state where both have ground points just at

Preprints (www.preprints.org) | NOT PEER-REVIEWED | Posted: 7 January 2018 doi:10.20944/preprints201801.0036.v1

ground surface. This results into binding of another atom (atom C) under the similar mechanism as for the case of atom A and atom B, which is shown in Figure 2 (a). In the binding of graphitic state atoms, the major portion of energy is related to force of surface format where only one-dimensional binding of atoms take place under the execution of electron-dynamics. A general behavior of structure evolution of one-dimension while in surface format is discussed elsewhere [9].

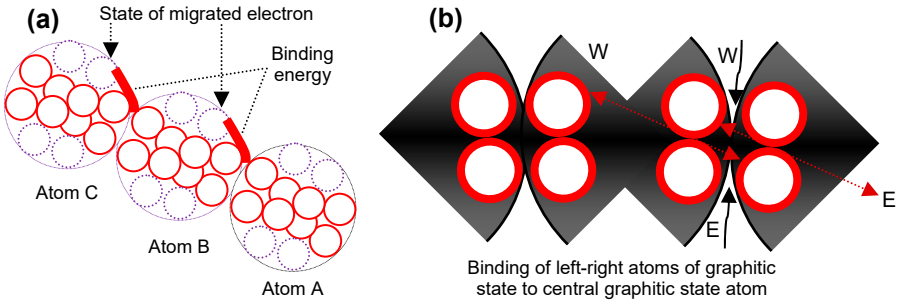

Figure 2: Binding of atoms structure evolution of graphitic state under the application of (a) electron-dynamics – a one-dimensional surface format structure and (b) attained dynamics – a two-dimensional surface format structure

When both atoms have been amalgamated under attained graphitic state, instead of binding under electron-dynamics, they bind under attained dynamics to evolve structure. At this instance, the graphite structural evolution is two-dimensional instead of one-dimensional. The binding energy shape like half parabola with slightly turned one end is no longer available where binding of graphitic state is under only their attained dynamics as per arrested difference of force of east west poles. Because of the difference of east west forces at point of binding two graphitic state atoms, they bind also only under attained dynamics (appreciable) as shown in Figure 2 (b); only the regions of paired electrons are shown dealing difference of operating surface format force in opposite poles. Graphitic state atoms bind under the difference of east west force while one pair of aligned electrons is along the east pole and one pair of aligned electrons is along the west pole as shown in Figure 2 (b). Binding of atoms in graphitic state is prevailed almost at ground surface because of binding points of atoms rightly at adjacent, which results into evolve their two-dimensional structure instead of one-dimensional. This is the reason that graphite structure deals porosity and soft binding having very low hardness under the involvement of two sorts of binding mechanisms. Here, two-dimensional structure means binding of graphitic state atom from both sides along both axes of east pole and west pole. On binding of atoms in either case of graphitic structure, they deal

Preprints (www.preprints.org) | NOT PEER-REVIEWED | Posted: 7 January 2018 doi:10.20944/preprints201801.0036.v1

stretching of energy knots clamping electron states along the force of influencing poles in tiny grains carbon film resulting into develop elongated graphite structure where each one-dimensional array of atoms of tiny grain is related to structure of smooth element as discussed elsewhere [16].

A Lonsdaleite state atom ground point just at ground surface is depositing (amalgamated) to bind diamond state atom already deposited under the ground point just at below ground surface as shown in Figure 3 (a) where expected binding point of two atoms when in the same state is also labelled. In the nucleation of synthetic diamond, a deposited atom is at highly heated scratched seeded surface of solid substrate which doesn't enable further attempting gravitation behavior of electrons under expansion of clamping energy knots even to the extent of size (mass) of an electron. Thus, that atom is in full limit of its solid state. Therefore, the ground point of diamond atom is at below to Lonsdaleite state atom candidate of binding at expected binding point once it transforms state into diamond state. In this context, Lonsdaleite state atom is in less expansion as compared to diamond state atom. The less and more expanded levels of clamped energy knots to filled and unfilled states in Lonsdaleite and diamond state atoms is shown in estimation in Figure 3 (a) as indicated by the downward arrow.

The ground point of Lonsdaleite state atom is just at ground surface because it is underneath to ground point of graphitic state atom which is at ground surface. In diamond state atom, tickling of electrons to their clamped energy knots introduces attempting gravitation behavior where expansion is at extended level. Thus, resulted energy placing along the trajectories of electrons dealing non-conservative force behavior is dissipating against the work done where infinitesimal displacement is being involved. On the other hand, tickling of electrons to clamped energy knots of Lonsdaleite state atom is at less dominating level resulting into introduce shorter infinitesimal displacement.

Once the downward side paired electrons of Lonsdaleite state atom (belonging to outer ring directing toward the south-side) is in touch to upward side paired electrons of diamond state atom (belonging to zeroth ring -nucleus), they deal tensing force, one in the forming of recovering and other in the form of lengthening as energy difference requires to maintain respective states as shown in Figure 3 (b). Once the Lonsdaleite state atom just deals the stability in terms of its ground point, electrons of east-west sides of filled states available at above the 'double arrow line'

Preprints (www.preprints.org) | NOT PEER-REVIEWED | Posted: 7 January 2018 doi:10.20944/preprints201801.0036.v1

transferred to unfilled states available at below the 'double arrow line' due to shift of force-energy paradigm resulting into transform Lonsdaleite state atom into diamond state atom as shown in Figure 3 (b) by directing the arrow. Now, electrons of transformed state atom also deal the expansion of clamped energy knots to electron states in the similar manner as in the case of targeted (deposited) diamond state atom where all four electrons directed toward south are being turned resulting into deal double clamping of energy knots to half-length. The mechanism of double clamping of energy knots to electrons in binding diamond state atoms involved non-conservative energy under non-conservative force.

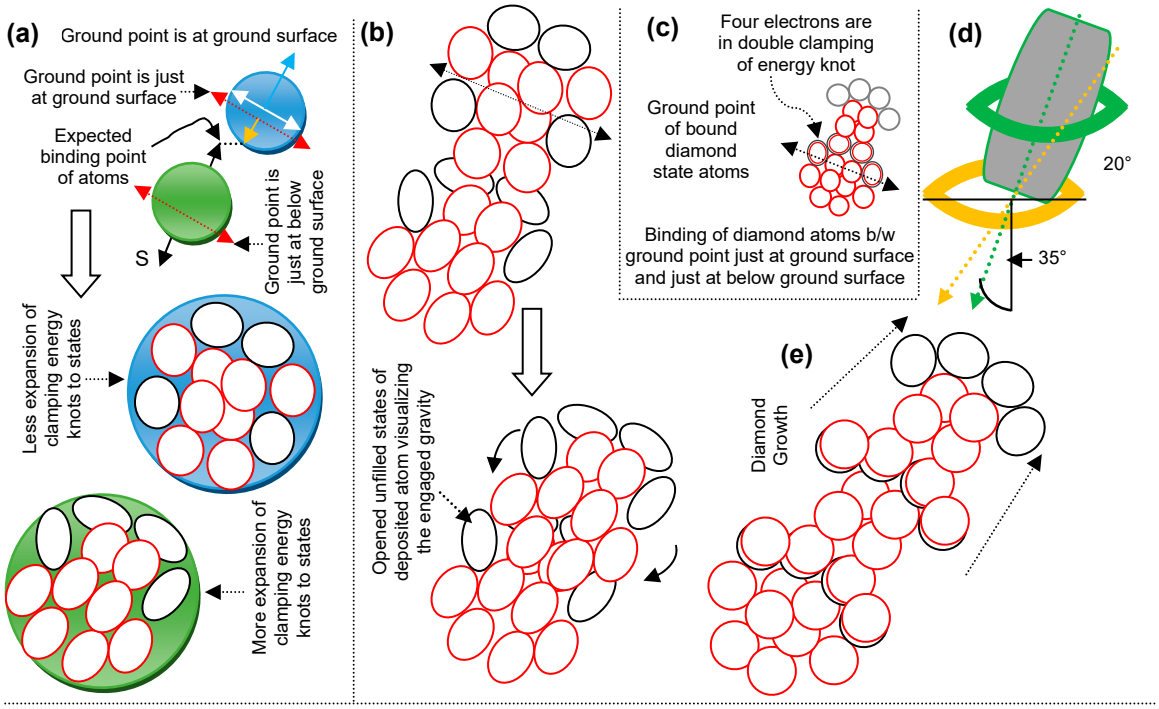

Figure 3: (a) ground points of Lonsdaleite and diamond state atoms along with expected mid-point and expansion of clamping energy knots to filled and unfilled states of electrons, (b) mechanism of electrons of depositing atom (when Lonsdaleite state atom just transformed into diamond state atom) to deal double clamping of unfilled states of deposited atom, (c) a new ground point (mid-point) on binding of two diamond state atoms, (d) single electron of Lonsdaleite state atom deals double clamping of energy knot under engaged potential energy on just transforming into diamond state atom and (e) south to ground tetra-dimensional topological structure; circles in red color are related to filled states, circles in black color are related to unfilled states and joint red-black circles are related to double clamping of energy knots to electrons

On dealing the double clamping of energy knot in diamond state atoms, their binding come into completion under the adjustment of tension and relaxation of energy knots clamping both filled and unfilled states as shown in Figure 3 (c). On binding diamond state atoms, their combined filled and unfilled states along with

Preprints (www.preprints.org) | NOT PEER-REVIEWED | Posted: 7 January 2018 doi:10.20944/preprints201801.0036.v1

zeroth rings adjust and compensate both expansion and contraction of clamping energy knots, thus, their attempting gravitation and levitation behaviors result into build combined ground point as shown in Figure 3 (c); on binding of two diamond state atoms, they dealt new ground point.

Difference in the expansion of atoms belonging to same element doesn't allow binding. Lonsdaleite state atom deals contraction of clamping energy knots to electrons as compared to diamond state atom, which is related to recovery state of carbon atom where orientation of electrons clamping energy knots constructs an ~110° angle and ground point is just at ground surface. In line with this, expansion of diamond atom is under the electrons constructing an approximate angle 125° in clamping energy knots and ground point is just at below ground surface. A single electron clamping by energy knot when in Lonsdaleite state reveals 110° (=90°+20°) just over the surface of unfilled state of diamond atom where once it transformed, dealt 125° (=90°+35°) angle. This results into deal double clamping of energy knot of electron of depositing atom at instant of transformation of Lonsdaleite state to diamond state atom as shown in Figure 3 (d) where approximate angle of single electron (of south-side in the outer ring) when carbon atom was in Lonsdaleite state and diamond state are also labelled. Further detail of expansion and contraction of clamping energy knot to electron under different states is given elsewhere [15].

Overall behavior of diamond growth is shown in Figure 3 (e). Now, electrons of bound atoms don't tickle to their clamped energy knots. In growth behavior, binding of diamond state atoms remained continue under the same mechanism as discussed in the case of Figure 3 (a-d) where atoms adjust and compensate contraction and expansion of clamping energy knots to their electrons at each time of binding new atom. Therefore, in diamond state binding growth behavior prevails from south to ground where ground point just at below ground surface to ground point just at ground surface is being explored.

The ground point of deposited diamond state atom doesn't lie at ground surface (or just at ground surface) but it lies just at below ground surface. Therefore, engaged expansion of clamping energy knots due to tickling of electrons in their states of atom is at pronounced level while attempting the gravitation behavior. Binding of diamond states atoms includes grounded format force as well as surface format force to locate their new combine ground point, which is the mid-point of ground points of two diamond state atoms. Thus, two diamond state atoms bind at

Preprints (www.preprints.org) | NOT PEER-REVIEWED | Posted: 7 January 2018 doi:10.20944/preprints201801.0036.v1

their newly located ground point called mid-point. Therefore, structure of diamond is related to topological structure where non-conservative energy is being invited by the engaged forces of grounded format and surface format. Therefore, the binding mechanism in diamond state atoms is south to ground.

Lonsdaleite state atoms obey the same mechanism of binding as in the case of binding of diamond state atoms but only two electrons of depositing atom deal double clamping of energy knot by considering rightly below two visualized unfilled states of deposited atom. In this manner, one atom dealt the force of grounded format while other atom dealt the force of surface format locating their new joint ground point, which is a mid-point related to their binding – a binding mechanism south to ground.

The ground point of deposited graphene state atom doesn't lie at ground surface (or just at ground surface) but it lies just at above ground surface. Therefore, engaged contraction of clamping energy knots due to tickling of electrons in their states of atom is at pronounced level while attempting the levitation behavior. Binding of graphene states atoms includes surface format force as well as space format force where it locates the new ground point, which is the mid-point of ground points of two graphene state atoms. Two graphene state atoms bind at their newly located ground point called mid-point. Structure of graphene is related to topological structure where non-conservative energy is being invited under the non-conservative forces of surface format and space format. Thus, in the case of graphene state atom, the structure evolution follows the opposite mechanism of binding atoms as disclosed in the case of diamond.

A carbon atom of nanotube state grows under the binding energy of identical state atoms attaining ground point at upper east lower west surface or upper west lower east surface as shown in Figure 4 (a). Atoms of such states bind only under the force of surface format where a minute level of force is being involved either belonging to space format or grounded format. In the carbon atom transition of electron to nearby unfilled state of the same quadrant at its both upper east lower west (or lower east upper west) is required to attain nanotube state where the energy is being involved for each transition resulting into bind amalgamated atoms under attained dynamics both at right side and left side as shown in Figure 4 (a). The energy is being involved at each transition of the electron possess shape like 'half-parabola a bit turned ending end' as shown in red color from both poles of the atom

Preprints (www.preprints.org) | NOT PEER-REVIEWED | Posted: 7 January 2018 doi:10.20944/preprints201801.0036.v1

thus forming V-shape between bound atoms as shown in Figure 4 (a). Therefore, the structural evolution of carbon atoms while in a nanotube state is a two-dimensional structural evolution involving the force of surface format mainly.

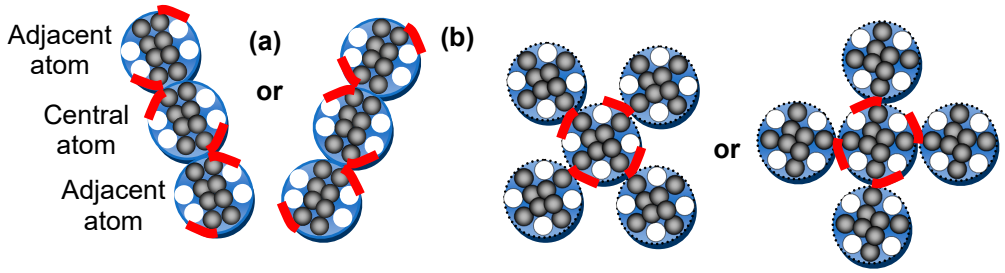

Figure 4: Atomic binding in two different ways in (a) nanotube – a two-dimensional surface format structure where energy in V-shape between atoms bind in successive manner of both-sided binding and (b) fullerene – a four-dimensional surface format structure where energy in half parabola shape is being involved to bind atom of each quadrant

When a carbon atom attains fullerene (buckyballs) state under the transition of electron at each pole while utilizing the force of surface format, it also deals energy shape like 'half-parabola a bit turned ending end' under trajectory of transferred electron to nearby unfilled state in all four quadrants as shown in Figure 4 (b). This results into binding of four carbon atoms with it just acquiring the same stable state; the structure of carbon fullerene state involves either upper west to west, west to lower west, lower east to east and east to upper east forces for the transition of each electron in each quadrant or west to upper west, lower west to west, east to lower east and upper east to east forces for the transition of each electron in each quadrant. Therefore, to nucleate the fullerene structure, the energy shape like half parabola is being involved to bind amalgamated atoms in its all four quadrants as shown in Figure 4 (b). This reveals that structural evolution while carbon atoms in fullerene state is four-dimensional where force of surface format is involved mainly including minute level force of space format or grounded format. Nucleation point of fullerene state atomic binding is the best example to represent force of surface format working at ground surface where ground point is related to exact centre point of the atom dealing no change in the position.

Glassy carbon involves all three formats of forces to evolve structure. Atoms of centre layer are in graphitic state where neutral behavior is in domination along east west poles as compared to north-south poles. Repeated sequence of tri-layers (gas, graphitic and Lonsdaleite state atoms) are being involved to evolve structure of glassy carbon as shown in Figure 5 (a). Layers of gas and graphitic state atoms bind

Preprints (www.preprints.org) | NOT PEER-REVIEWED | Posted: 7 January 2018 doi:10.20944/preprints201801.0036.v1

under arrested energy under the joint application of grounded and surface format forces resulting into deal double clamping of paired electron. In a layer of gas state atoms, paired electrons of each atom deal double clamping of energy knots of paired unfilled states of graphitic state atoms in a layer under the adjustment of contraction and expansion of energy knots. The paired electrons of each gas state atom in the array deal double clamping of energy knots of each graphitic state atom in the array from the back side while attempting forcefully the gravitation behavior under increased potential energy of the electrons. Layers of graphitic state atoms and Lonsdaleite state atoms bind under arrested energy under the joint application of surface and space format forces resulting into deal double clamping of paired electron. In a layer of Lonsdaleite state atoms, paired electrons of each atom deal double clamping of energy knots of paired unfilled states of graphitic state atoms in a layer under the adjustment of contraction and expansion of energy knots. The paired electrons of each Lonsdaleite state atom in the array deal double clamping of energy knots of each graphitic state atom in the array from the front side while attempting the forcefully levitation behavior under decreased potential energy of the electrons. Layer of Lonsdaleite state atoms (layer C) and next layer of gas state atoms (layer A) deal the compensation in consecutive manner in terms of binding of each sequence of three layers as shown in Figure 5 (b). Difficulty is being faced to shape exactly the expansion and contraction of clamping energy knots to filled states and unfilled states and reader may adjust those accordingly.

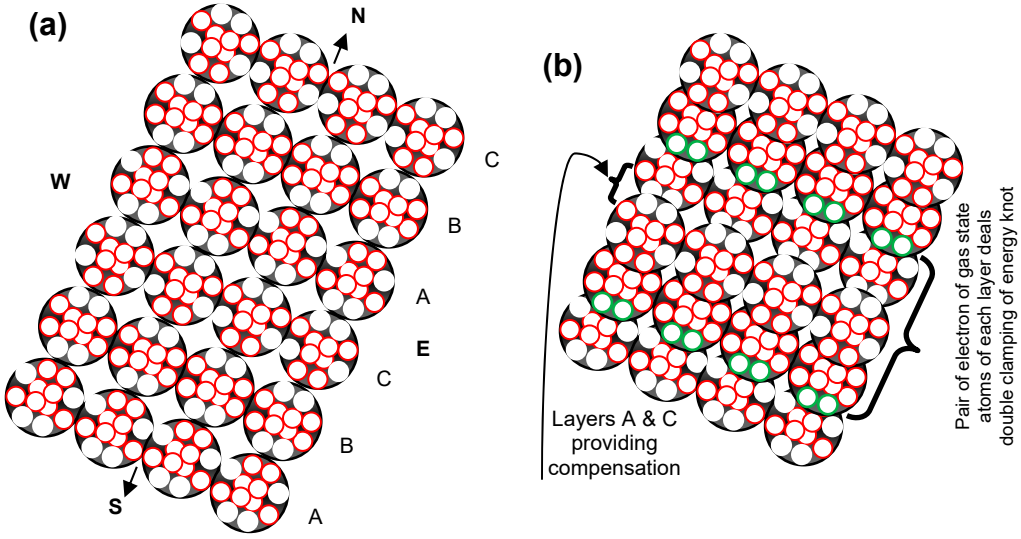

Figure 5: Structure of glassy carbon involves consecutive binding of three different layers of atoms; gas state (layer A) – graphitic state (layer B) – Lonsdaleite state (layer C)

Preprints (www.preprints.org) | NOT PEER-REVIEWED | Posted: 7 January 2018 doi:10.20944/preprints201801.0036.v1

The binding mechanism of layers of different state carbon atoms reveals the involvement of forces of all three format and in reverse order where atoms of gas state layer are dealing grounded format force instead of space format force while atoms of Lonsdaleite state layer are dealing space format force, but atoms of graphitic state layer are retaining the ground point at ground surface, thus, involving the force of original surface format.

The binding of atoms in the graphite structure is under uniform electron-dynamics because dealing the major ground surface forces where their difference at centre point of each graphitic atom enable the binding and same is the case of structure evolution in nanotube and fullerene structures, hence, they are said to be the dimensional structure of single format force. Structure evolution of different basis-structures while considering the single format force is discussed elsewhere [9]. However, non-uniform electron-dynamics are being involved in the structure which is evolved under the involvement of force of two formats or three formats and they are termed as the topological structure as in the case of diamond, lonsdaleite and graphene where forces of bi-format are being involved but in the case of glassy carbon forces of tri-format are being involved. The uniform electron-dynamics and non-uniform electron-dynamics were being considered in binding atoms while studying carbon films in a new insight [1]. In graphite structure tiny grains, atoms elongate resulting into transform structure of smooth elements as discussed elsewhere [1, 16].

Hardness at Mohs scale of atoms while dealing graphite structure and different transformed structure at nanoscale is sketched in Figure 6. Zero value of hardness accounts in the case of atoms when they are in the gas state. The hardness of graphite structure and other different transformed structures of carbon is related to attempting levitation gravitation behaviors at different scales as discussed above. Different value of wave number of printed intensity of energy signals from graphite structure and various transformed structures of carbon in Raman spectroscopy reveal different trends of propagating photons under different positions of electron states in their atoms as validated by energy loss spectroscopy as well [16].

Preprints (www.preprints.org) | NOT PEER-REVIEWED | Posted: 7 January 2018 doi:10.20944/preprints201801.0036.v1

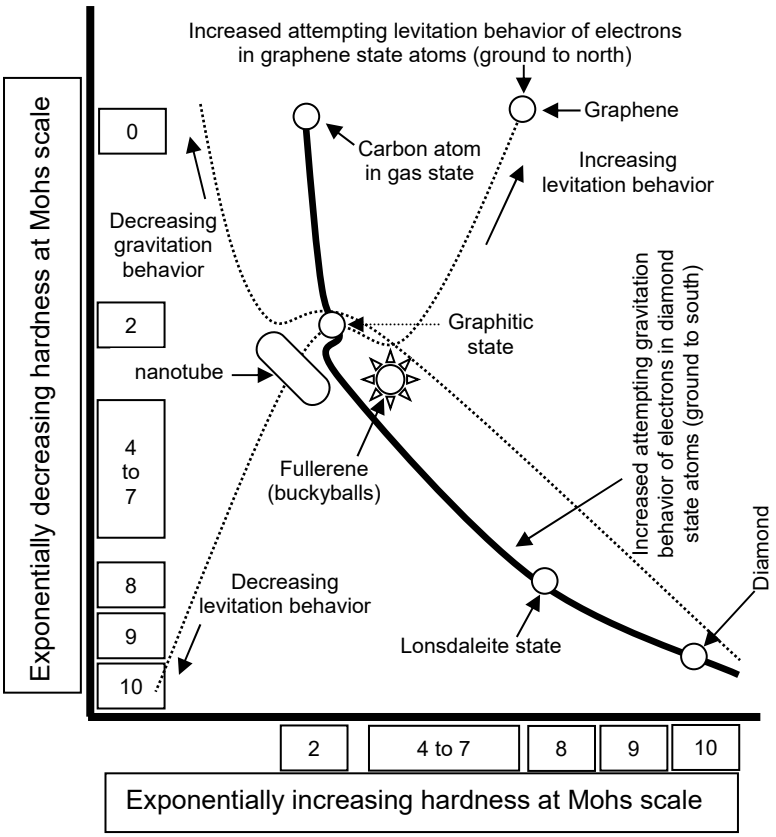

Figure 6: A sketch of approx. hardness (at Mohs scale) on the basis of available in the literature of various carbon states (allotropic forms) versus allied levitation-gravitation behavior

3.0 Conclusions

By migrating from the filled state, electrons of outer ring under state-dependent but path-independent force transform into different states of carbon atom where certain shape energy is being involved along each configuring trajectory. In the carbon atom where two electrons of outer ring occupied states on north side and remaining two electrons of outer ring occupied states just below the line of east west poles at ground surface is related to gas state atom. In the carbon atom where two electrons of outer ring retain position in the states available at just above the line of east west poles and two electrons of outer ring retain position in the states available at just below the line of east west poles, it is related to graphitic state. In the carbon atom where all the electrons of outer ring retain position in states available at south side, it deals diamond state.

A graphite structure is being evolved both under electron-dynamics and attained dynamics of atoms. Carbon atoms in graphitic state deals one-dimensional structural evolution when executing electron-dynamics and two-dimensional structure when

Preprints (www.preprints.org) | NOT PEER-REVIEWED | Posted: 7 January 2018 doi:10.20944/preprints201801.0036.v1

amalgamated only under attained dynamics. In one-dimensional structure evolution of graphitic state atoms, binding is under the energy shape like half parabola with slightly turned ending end where mainly surface format force involves inviting energy. Graphitic state atoms evolve two-dimensional structure when the energy is being arrested under the difference of force of east west poles among atoms amalgamated under their attained dynamics. Carbon atoms while in nanotube state deals two-dimensional structural evolution where energy shape like V and inverted V in successive manner are being involved under the execution of electron-dynamics to bind atoms at both sides. To nucleate fullerene structure, all four electrons equidistant from the centre involve in placing energy shape like half parabola a bit turned ending end where from all four quadrants atoms bind resulting into evolve four-dimensional structure. In both nanotube and fullerene structure binding energy is being resulted under the involvement of force of surface format mainly where a minute level of force either grounded or surface format is being involved.

In diamond state binding of atoms, all four electrons of outer ring of depositing atom deal double clamping of energy knots of all four unfilled states of outer ring of deposited atom where non-conservative forces are being involved in placing the energy under configured trajectory of those electrons. In binding of Lonsdaleite state atoms, instead of dealing double clamping of four electrons, their binding involves only double clamping of two electrons. In the case of graphene state binding of atoms, a similar but opposite in description mechanism involve as in the case of binding of diamond state atoms where growth behavior prevails from ground to north when ground point just at ground surface to ground point just at above ground surface is being involved. Diamond state atoms bind while locating new ground point at mid-point between south and ground where forces of grounded and surface formats are being involved. Graphene state atoms bind while locating new ground point at mid-point between ground and north where forces of surface and space formats are being involved. Diamond structure is south to ground tetra-dimensional topological structure, Lonsdaleite structure is south to ground bi-dimensional topological structure and graphene structure is ground to north tetra-dimensional topological structure.

A glassy carbon structure involves the forces of all three formats, which validate that structure of glassy carbon is related to fully topological structure. In the structure evolution of glassy carbon, the energy is being placed from the front side while

binding atoms of each layer of lonsdaleite state to atoms of each layer of graphitic state where electrons are attempting the forcefully levitation behavior under their decreased potential energy, however, the energy is being placed from the back side while binding atoms of each layer of gas state to atoms of each layer of graphitic state where electrons are attempting the forcefully gravitation behavior under their increased potential energy. In repeated sequence of tri-layers, both layers of lonsdaleite state atoms and gas state atoms provide the compensation of adjusting structure under the contraction and expansion of clamped energy knots to electrons of atoms. These investigations lead into present the origin of science and technology at clear grounds opening new areas of research on different lines as compared to existing ones. These investigations enable to understand different phenomena related to optics and photonics, inter-changeable paradigm of force-energy and light-matter interactions along with many others.

References:

[1] M. Ali, M. Ürgen, Switching dynamics of morphology-structure in chemically deposited carbon films -A new insight, Carbon 122 (2017) 653-663.

[2] S. Link, M. A. El-Sayed, Shape and size dependence of radiative, nonradiative and photothermal properties of gold nanocrystals, Int. Rev. Phys. Chem. 19 (2000) 409- 453.

[3] S. C. Glotzer, M. J. Solomon, Anisotropy of building blocks and their assembly into complex structures, Nature Mater. 6 (2007) 557-562.

[4] M. Ali, I –N. Lin, The effect of the electronic structure, phase transition and localized dynamics of atoms in the formation of tiny Particles of gold, http://arXiv.org/abs/1604.07144.

[5] M. Ali, I –N. Lin, Development of gold particles at varying precursor concentration, http://arxiv.org/abs/1604.07508.

[6] M. Ali, I –N. Lin, Tapping opportunity of tiny shaped particles and role of precursor in developing shaped particles, http://arxiv.org/abs/1605.02296.

[7] M. Ali, I –N. Lin, Controlling morphology-structure of particles at different pulse rate, polarity and effect of photons on structure, http://arxiv.org/abs/1605.04408.

[8] M. Ali, I –N. Lin, Formation of tiny particles and their extended shapes – Origin of physics and chemistry of materials, http://arxiv.org/abs/1605.09123.

[9] M. Ali, Structure evolution in atoms of solid state dealing electron transitions. http://arxiv.org/abs/1611.01255.

[10] M. Ali, The study of tiny shaped particle dealing localized gravity at solution surface. http://arxiv.org/abs/1609.08047

[11] M. Ali, Atoms of electronic transition deform or elongate but do not ionize while inert gas atoms split. http://arxiv.org/abs/1611.05392.

[12] M. Ali, Revealing the Phenomena of Heat and Photon Energy on Dealing Matter at Atomic level. https://www.preprints.org/manuscript/201701.0028/v10

[13] M. Ali, M. Ürgen, Deposition Chamber Pressure on the Morphology of Carbon Films (2018). (in submission process)

[14] M. Ali, Nanoparticles-Photons: Effective or Defective Nanomedicine, J. Nanomed. Res. 5 (2017): 00139.

[15] M. Ali, Why some atoms are in gaseous state and some in solid state but carbon work on either side (2018). (in submission process)

[16] M. Ali, I –N. Lin. Phase transitions and critical phenomena of tiny grains thin films synthesized in microwave plasma chemical vapor deposition and origin of v1 peak. http://arxiv.org/abs/1604.07152

[17] M. Ali, I –N. Lin, C. –J. Yeh, Predictor packing in developing unprecedented shaped colloidal particles (2018). (in submission process)

[18] M. Ali, M. Ürgen, Simultaneous growth of diamond and nanostructured graphite thin films by hot filament chemical vapor deposition, Solid State Sci. 14 (2012) 150-154.

Authors' biography:

Mubarak Ali graduated from University of the Punjab with B.Sc. (Phys& Maths) in 1996 and M.Sc. Materials Science with distinction at Bahauddin Zakariya University, Multan, Pakistan (1998); thesis work completed at Quaid-i-Azam University Islamabad. He gained Ph.D. in Mechanical Engineering from Universiti Teknologi Malaysia under the award of Malaysian Technical Cooperation Programme (MTCP;2004-07) and postdoc in advanced surface technologies at Istanbul Technical University under the foreign fellowship of The Scientific and Technological Research Council of Turkey (TÜBİTAK; 2010). He completed another postdoc in the field of nanotechnology at Tamkang University Taipei (2013-2014) sponsored by National Science Council now M/o Science and Technology, Taiwan (R.O.C.). Presently, he is working as Assistant Professor on tenure track at COMSATS Institute of Information Technology, Islamabad campus, Pakistan (since May 2008) and prior to that worked as assistant director/deputy director at M/o Science & Technology (Pakistan Council of Renewable Energy Technologies, Islamabad; 2000-2008). He was invited by Institute for Materials Research (IMR), Tohoku University, Japan to deliver scientific talk on growth of synthetic diamond without seeding treatment and synthesis of tantalum carbide. He gave several scientific talks in various countries. His core area of research includes materials science, physics & nanotechnology. He was also offered the merit scholarship (for PhD study) by the Government of Pakistan but he couldn't avail. He is author of several articles published in various periodicals (https://scholar.google.com.pk/citations?hl=en&user=UYjvhDwAAAAJ).