Atoms in Gaseous and Solid States and their Energy and Force Relationships under Transitional Behaviors

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Abstract

By recalling the conventional studies of atoms, it is possible to discover new insights tackling the present and future challenges. The electrons and energy knots form atoms of different elements. In different elements, atoms are recognized based on the number of electrons and energy knots. Depending on how many filled and unfilled states in an atom of the element are allocated, the lattice is formed or constructed by intercrossing the overt photons having fixed lengths and numbers. In the intercrossing of the overt photons, the centers of the overt photons remained fixed at a common point. Gaseous atoms keep different schemes of intercrossing overt photons than solid atoms. Except for the hydrogen atom, the atoms possess the same valency as specified. Two electrons are occupied by the two energy knots in the hydrogen atom, whereas four electrons are occupied by the four energy knots in the helium atom. A helium atom is related to the zeroth ring in all higher-order atoms. In order to validate these statements above, the concept of considering protons and neutrons is no longer significant. As far as the gaseous atoms are concerned, electrons possess the minimum required potential energy. So, the electrons remain above the middle of occupied energy knots in the gaseous atoms for more than half the length, and they keep on experiencing the maximum required levitational force along the north pole. In solid atoms, electrons possess the maximum required potential energy. So, the electrons remain below the middle of occupied energy knots in the solid atoms in more than half the length, and they keep on experiencing the maximum required gravitational force along the south pole. Atoms undertake the transition states under the established relation of energy and force. In the transition, electrons of the atom deal with infinitesimal displacements by remaining within the occupied energy knots. The related orientational force keeps on exerting to the electrons introducing the recovery, neutral, re-crystallization, and liquid states for their atoms. In converting a gaseous atom into the liquid state, electrons left to the center of the atom orientate north to east clockwise, and electrons right to the center of the atom orientate north to west anti-clockwise. In converting a solid atom into the liquid state, electrons left to the center of the atom orientate south to east anti-clockwise, and electrons right to the center of the atom orientate south to west clockwise. These fundamental revolutions shed new light on the development of science and engineering of materials.

Introduction

Understanding the mechanisms of the formation of atoms and then relating them with each other enable one to develop the sustainable science of materials. The periodic table shows the positions of atoms in the form of rows and columns based on their characteristics. Such grouping of the atoms mainly depends on the atomic number, mass number, valence number, electronic configuration, atomic radius, and electronegativity. The periodic table also provides information about the valency of atoms in different elements.

The lattice or energy-knot-net of carbon atoms remains the same in its different allotropes [1]. Solid atoms elongate at an appropriate level of ground surface [2]. An electronic orientation in the particles determines the nature of amalgamation [3]. Transitional behavior gold atoms amalgamated at the solution surface to form the monolayer assembly where triangular shape tiny particles were developed [4]. Structural evolutions of atoms when executing confined interstate electron dynamics involve conservative forces, as discussed elsewhere [5]. The electron dynamics in the silicon atom convert the heat energy into the photon energy [6]. Such studies reveal that atoms keep electronic structures different from the studied ones.

Mercury belongs to the transition metals group, where it neither shows solid behavior nor gaseous behavior, but it behaves in a liquid state. Metals such as cesium, gallium, and rubidium remain solid at room temperature. However, these metals melt above room temperature. Such behaviors of the atoms specify that filled and unfilled states of the outer ring play an important role. Further, inert gas atoms do not show any sort of affinity with atoms of other elements. They even do not bind to evolve, form, or develop the structure. Inert gas atoms split under the excessive propagation of featured photons [2]. A fundamental relation between energy and force is also required to study gaseous and solid atoms.

At a suitable concentration of gold precursor, a large number of tiny particles of triangular shape got developed [7]. Geometrical shapes of the gold particles were developed under bipolar and unipolar modes of the pulses [8]. In the pulse-based solution process, incompatible packing developed the distorted particles, and compatible packing developed the anisotropic particles [9]. In the pulse-based process, the processing of gold solution developed the geometrical particles, and the processing of silver solution did not develop the geometrical particles [10]. Particles of unusual shapes were developed, identifying the specific role of energy and force in developing [11]. These studies deduce different behaviors of atoms.

The atomic structure of carbon allotropes and their binding has been discussed [1]. Different testing and analysis results from different regions of the deposited carbon film explain how difficult it is to reach an appropriate conclusion [12]. The morphology and structure of particles in depositing carbon films are altered under the variation of localized process conditions [13]. Carbon films were developed with different grains and particles at varying chamber pressure [14].

The possibility of assembling colloidal matter into meaningful structure enables atoms and molecules to be candidates for future materials [15]. Understanding the individual dynamics of the formation of tiny-sized particles is essential prior to their assembling into functional large-sized particles [16]. Hard coating is due to the varyingly switched energy and forced behaviors of gaseous and solid atoms, where non-conservative energy is involved in engaging the non-conservative force, too [17].

Sir Isaac Newton formulated the laws of motion and universal gravitation. The law of universal gravitation involves the mathematical description of gravity. Sir Albert Einstein developed a general theory of relativity and mass and energy relationship, and the principle of relativity was further explained by extending it to the gravitational field, where the concept of anti-gravity (levity) was not incited. The general theory of relativity remained only a model for a large-scale spectrum structure. The different models, such as Rutherford’s atomic model and Bohr’s atomic model, can be found in the literature defining the atomic structure. In addition, Yukawa’s theory also explains the stability of the nucleus, which is mainly related to the neutron to neutron binding in an atom.

Gaseous atoms should evolve their structures above the ground surface, semisolid atoms should evolve at the ground surface, and solid atoms should evolve the structures below. However, solid atoms under transitional behaviors are also eligible to develop structures [3, 4, 7-11]. Based on these observations, the structural evolution in atoms has been discussed [5]. Atoms should keep different structures than those considering shells, orbits, and bandgaps for flowing electrons, Fermi levels, and nucleus. The identity of an atom is discussed with the orbital configurations and shells. The nucleus of an atom is discussed with protons and neutrons. The atoms are also discussed with quantum physics. However, the science of materials raises the fundamental question of how atoms form. Why do atoms exist in different states? What kind of descriptive mechanism do they require?

In the current study, atomic structures in the naturally found elements are elucidated under the new insights. The transitional behaviors in gaseous and solid atoms and the generalized relationships between their energy and force behaviors are established here. The study of electronic orientation is also presented along with the future outlook.

Experimental Details

This work does not include any experimental details. However, all those studies studying the atomic structure, processing, and synthesizing different materials can consider this work. In fact, in all those areas, where the fundamental study of atoms, the study of morphology and structure, the study of force and energy relation, and the study of light or photon-matter interaction are the topics of interest, the work discussed here is helpful.

Results And Discussion

The atomic structure of the carbon atom under different state behaviors has been discussed in another study [1], discussing the construction of its lattice by the fixed lengths and numbers of intercrossed photons. Shorter length photons or overt photons are the subsets of the mainstream or longer length photons [6]. Atoms do not ionize; in the case of solid behavior, they modify to elongate or deform; in the case of inert behavior, they split; and in the case of gaseous behavior, they squeeze [2]. It indicates that the center of an atom in any element does not involve the mass of the electron, so the center of the atom should be only the point of intercrossed overt photons.

In constructing an atomic lattice, photons of the appropriate lengths and numbers intercross by keeping the centers at a common point. The force and energy of intercrossed overt photons remain actual. The intercrossed overt photons shape energy knots for both filled and unfilled states in an atom. The overt photons shape filled and unfilled states of energy knots as per the number of filled and unfilled states atoms in different elements possess. Therefore, atoms of different elements can be differentiated based on filled and unfilled states. The intercrossed overt photons shape the lattice of an atom related to any element so that energy knots clamp the positioned electrons or enter electrons precisely.

The overt photons' intercrossing schemes are different in the atoms of gaseous, semisolid, and solid elements. The state of an electron is related to the filled state. The state of valency is related to the unfilled state. The energy knots shaped by the intercrossed overt photons clamp the electrons from the downsides to form the gaseous atoms. The energy knots shaped by the intercrossed overt photons clamp the electrons from the upsides to form the solid atoms. In the atoms of semisolids, the energy knots shaped by the intercrossed overt photons clamp the electrons from the midpoints.

Excluding hydrogen atoms, adding two more electrons in the central ring of any atom is required to shape the zeroth ring. Atoms are already known to have the first shell, which has occupied two electrons. However, the first shell is now a zeroth ring, which contains four electrons in the present case. Therefore, an atom requires two more electrons to shape the zeroth ring. The zeroth ring can be termed the nucleus. When no electron is available for the empty energy knot, it is referred to as an unfilled state. The number of unfilled states indicates the valency of the atom. When the surface force is exerted on the electrons of a solid atom at the appropriate ground surface level, energy knots clamped electrons are stretched along both east-west poles so that atom is uniformly elongated from the sides of its center [2].

Atoms consist of electrons, which are occupied by the sizeable energy knots. Excluding the inert behavior atoms, atoms of gaseous, semisolid, and solid behaviors also possess the unfilled states. The construction of their lattices requires the precise intercrossing of the fixed lengths and numbers of photons. A least measured length photon is formed by the two ‘unit photons’, where each unit photon has a shape like the Gaussian distribution of turned ends [6].

When two least measured length photons intercross, they shape a knot through intercrossing. A shape of tilted digit eight is constructed, which is related to the lattice of the hydrogen atom. The intercrossing of two shapes of tilted digit eight constructs the lattice of molecular hydrogen. The number of electrons becomes equal to the number of electrons in a helium atom. However, the helium atom contains four electrons under the originally built-in scheme of energy knots instead of separately intercrossed two shapes of tilted digit eight. Two shapes of digit eight are constructed in the helium lattice. So, four least-length photons intercross simultaneously to construct the lattice.

Atoms contain either the first ring, second ring, and so on, depending on the number of electrons. Other than the zeroth ring, the arrangement of electrons in the available rings of atoms in different elements is the same as studying them in the earlier studies. Two more electrons need to be added to shape the zeroth ring in atoms of all elements, except the hydrogen atom. In addition to two more filled states in the zeroth ring, a net of energy knots in the atom of any element follows the detailed description of filled and unfilled states as mentioned previously, except hydrogen element. In atoms of all elements other than hydrogen elements, central four filled state electrons shape the zeroth ring.

Two photons of the least measured length construct a tilted digit eight, as shown in Figure 1 (a). The electronic configuration of the hydrogen atom, hydrogen molecule, and helium atom is shown in Figure 1 (b-d). When two photons of the least measured length are intercrossed, they shape a tilted digit eight, which is the lattice of a hydrogen atom, as shown in Figure 1 (a). Electrons of the tiniest mass are trapped in the empty spaces of the energy knots. It is shown in Figure 1 (b) in black and green colors. Two hydrogen atoms overlap to form the molecular hydrogen, shown in Figure 1 (c). The structure of the helium atom is shown in Figure 1 (d).

In atoms of all elements, terminated ends of chains are related to the outer ring. Atoms of specific behavior can keep empty spaces left at the outer ends of their constituted chains. A space is precisely the size of an energy knot through which an electron can be fixed but without occupying the energy knot. An argon atom might have eight empty spaces in the outer ring and eight filled states, as indicated by the arrows in Figure 2. These eight empty spaces are not related to unfilled states, but each is in the size or dimension of an energy knot. Under such a scenario and to build the chain having one less state at both ends, intercrossed overt photons shape a chain of states with a length short by a unit photon at both ends. This observation justifies the argon atom model, as shown in Figure 2.

The structure of the lithium atom is shown in Figure 3. The zeroth ring is related to the nucleus. The outer ring is related to the first ring, also displayed in Figure 3. In Figure 3, the lithium atom has a large volume to store energy as arrowed in the regions labeled by 1, 2, 3, and 4. Due to this capacity for storing energy, the structure of lithium is considered quite suitable for energy storage. The lithium atom contains two chains of states, as labeled in Figure 3.

Gaseous, semisolid, and solid atoms describe their valency by involving the outer ring's filled and unfilled states. To execute interstate electron dynamics, either non-confined [1] or confined [5], an atom requires a suitable position for its filled and unfilled states in the outer ring. Inert gas atoms neither undertake confined nor non-confined electron dynamics. Further investigations are required to understand the atomic nature of inert behavior elements. A carbon atom remains in a gaseous, semisolid, or solid form depending on the position of electrons and unfilled states in the outer ring [1]; by changing the position of an electron in the nearby suitable unfilled, a carbon atom gets converted into another state. Therefore, the presence of unfilled states or empty energy knots in the outer rings of atoms is according to their prescribed numbers of electrons and valency. One more electron is required to occupy the second state in a hydrogen atom. The hydrogen atom does not contain the zeroth ring due to two electrons in total. In this way, the helium atom is only related to the zeroth ring having no other ring. Thus, the helium atom can be termed the nucleus in all higher-order atoms.

The center of an atom is located at the common point of the intercrossed overt photons. The electrons keep more than half the length to the upward side in gaseous atoms from the mid of occupied energy knots. From the mid of occupied energy knots, the electrons keep more than half the length to the downward side in solid atoms.

A gaseous atom keeps the ground point in space format by obeying the original state's set energy and force behaviors. When the gaseous atom converts into the liquid state, it gains transitional energy (E_T). That atom increases the potential energy level for the electrons by decreasing their levitational force (F_L). Therefore, electrons of the gaseous atom increase the potential energy to undertake the liquid state. A ground point of the atom reaches near the ground surface. The gained ‘E_T' is released if the liquid state atom gets restored to the original gaseous state. A gaseous atom attains the original state by increasing the ‘F_L’ of electrons. Here, the potential energy of the electrons is decreased. An inversely proportional relationship between ‘E_T’ and ‘F_L’ is symbolically sketched in Figure 4 (a).

In Figure 4 (a), the label (1) indicates the conversion of gaseous state atoms into the liquid state under the decreasing ‘F_L’ exerting at the electron levels where ground points of the atoms are reached near the ground surface, the label (2) indicates the work is done by the gaseous state atoms, the label (3) indicates the conversion of liquid state atoms into the gaseous state under the increasing ‘F_L’ exerting at the electron levels where ground points of the atoms are reached above the ground surface, and the label (4) indicates the work is done on the liquid state atoms.

In converting a gaseous state atom from its original state to a liquid state, ‘E_T’ is gained by the atom, which is inversely proportional to the exerted ‘F_L’ at the electron levels in equation (1).

$E_T \propto 1/ F_L$ or $E_T = L_e \times 1/ F_L$ … (1)

Electrons of the gaseous state atoms deal with the low potential energy. The ‘L_e’ is related to the levitational constant, which indicates the number of electrons in a gaseous state atom. ‘L_e’ is different for atoms of different gaseous elements. In equation (1), the ‘L_e’ is constant for atoms of the same element. The chemical activity of the transitional behavior of gaseous atoms introduces different chemical reactivity. Both energy and force behaviors change in the transition state of the gaseous atom.

When an atom of the solid behavior is converted into the liquid state, ‘E_T’ absorbs positioned electrons in the required orientation. Thus, electrons minimize potential energy dealing with a solid atom in negative sign working – a gravitational force (F_G) exerting along the relevant poles of electrons decreases. Electrons of the atom tilt upward under the infinitesimal displacements to take the liquid state. The potential energy of the electrons also decreases. In the infinitesimal displacements, electrons remain within the occupied energy knots. When the atoms of liquid behavior get restored to the atom of actual solid behavior, an equal amount of energy in the sense of gaining is involved in attaining the original ground point. In this case, that atom now deals with the positive work. Therefore, the solid atoms dealing with the liquid states show a direct relationship between E_T and F_G, symbolically sketched in Figure 4 (b).

In Figure 4 (b), the label (1) indicates the conversion of solid atoms into the liquid state under the decreasing ‘F_G’ exerting at the electron levels where ground points of the atoms are reached near the ground surface. The label (2) indicates the work is done on the solid atoms, the label (3) indicates the conversion of liquid state atoms into the solid atoms under the increasing ‘F_G’ exerting at the electron levels where the ground points of the atoms are reached below the ground surface, and the label (4) indicates the liquid state atoms do the work.

In converting a solid atom from its original state to a liquid state, 'E_T' absorbed the atom is directly proportional to the exerting 'F_G' at the electron levels in equation (2).

$E_T \propto F_G$ or $E_T = G_e \times F_G$ … (2)

Electrons of solid atoms deal with high potential energy. The 'G_e' is related to the gravitational constant, which indicates the number of electrons in a solid atom. 'G_e' is different for atoms of different solid elements. In equation (2), the 'G_e' is constant for atoms of the same element. The chemical activity of transitional behavior of solid atoms introduces different chemical reactivity. Energy and force behaviors are changed in each established transitional behavior of the solid atom.

Electrons of the hypothesized gaseous atom depict different transitional behaviors as their tilting. In Figure 5, only the left-positioned electron and right-positioned electron to the center of a gaseous atom are considered. When the gaseous atom keeps its original state, the left-positioned electron keeps orientation along the 40°, which is on the left side of the normal line drawn from the center, as shown in Figure 5 (a); the right-positioned electron also keeps orientation along the 40°, which is on the right side to the normal line drawn from the center. In the recovery state of a gaseous atom, the left-positioned electron keeps orientation along the 20°, which is on the left side to the normal line drawn from the center, as shown in Figure 5 (b); the right-positioned electron also keeps orientation along the 20°, which is on the right side to the normal line drawn from the center. In the neutral state of a gaseous atom, the left-positioned electron keeps orientation along the 5°, which is on the left side of the normal line drawn from the center, as shown in Figure 5 (c); the right-positioned electron also keeps orientation along the 5°, which is on the right side to the normal line drawn from the center.

In the re-crystallization and liquid states of the gaseous atom, left-positioned electrons keep orientations along the 25° and 50°, respectively, which are on the right sides of the normal lines drawn from the centers as shown in Figure 5 (d) and Figure 5 (e), respectively; right-positioned electrons also keep orientations along the 25° and 50°, respectively, but these are on the left sides to the normal lines drawn from the centers. In Figure 5, degrees related to the orientations of electrons are in approximate values.

Electrons of the hypothesized solid atom depict transitional behaviors as per their tilting. In Figure 6, only the left-positioned electron and right-positioned electron to the center of a solid atom are considered. Under the original state of a solid atom, the left-positioned electron keeps orientation along the 40°, which is on the left side to the normal line drawn from the center, as shown in Figure 6 (a); the right-positioned electron also keeps orientation along the 40°, which is on the right side to the normal line drawn from the center. In the recovery state of a solid atom, the left-positioned electron keeps orientation along the 20°, which is on the left side to the normal line drawn from the center, as shown in Figure 6 (b); the right-positioned electron also keeps orientation along the 20°, which is on the right side to the normal line drawn from the center. Under the neutral state of a solid atom, the left-positioned electron keeps orientation along the 5°, which is on the left side to the normal line drawn from the center, as displayed in

Figure 6 (c); the right-positioned electron also keeps orientation along the 5°, which is on the right side to the normal line drawn from the center.

Under the re-crystallization and liquid states of the solid atom, left-positioned electrons keep orientations along the 25°, and 50°, respectively, which are on the right sides of the normal lines drawn from the centers depicted in Figure 6 (d) and Figure 6 (e), respectively; right-positioned electrons also keep orientations along the 25° and 50°, respectively, which are on the left sides to the normal lines drawn from the centers. In solid atoms, orientations of electrons are taken from their south poles rather than from their north poles. In Figure 6, degrees related to the orientations of electrons are in approximate values.

Electrons cross projected lines from the normal lines to the centers when their atoms are in the re-crystallization and liquid states. However, electrons do not cross the projected poles of their atoms. It is shown in Figure 5 for the gaseous atom case and Figure 6 for the case of the solid atom. The centers of the hypothesized gaseous atom and solid atom are also shown in Figures 5 and 6. Poles or axes of left-positioned electron and right-positioned electron to the center of the gaseous atom and solid atom under the neutral state are labeled in Figure 5 and Figure 6, respectively. In hypothesized gaseous and solid atoms, the origin of reference of a left-positioned electron to the atom's centre is different from the origin of reference of a right-positioned electron to the center of the atom.

In the original state gaseous atom and solid atom, both left-positioned and right-positioned electrons to the center of the atom keep orientating towards the north from the upward sides and towards the south from the downward sides, respectively. In both gaseous and solid atoms, electrons change the features of occupied energy knots depending on the orientational force and potential energy. In Figures 5 and 6, electrons do not show clamping energy knots, and the curved arrows symbolically show the tilting during transition states.

A left-positioned electron and a right-positioned electron to the center of a gaseous atom deal with clockwise and anti-clockwise tilting, respectively, in different transition states. A left-positioned electron and a right-positioned electron to the center of the solid atom deal with anti-clockwise and clockwise tilting, respectively, in different transition states. Transitional behaviors of the atoms are being controlled from the centers. The centers of the atoms control the orientations of electrons originating from the external environment. In gaseous and solid atoms, a zone related to the exerting impartial force at the electron level is also discussed elsewhere [5].

In the transition state, either gaseous or solid atoms, electrons deal with infinitesimal displacements by remaining within the occupied energy knots. Therefore, the relationships between energy and force behaviors in gaseous and solid atoms have been discussed above. A gaseous atom or a solid atom undergoes a liquid state by varying the potential energy of comprised electrons, where electrons remain clamped by the associated energy knots. In the liquid state of a gaseous atom, the infinitesimal displacements of the electrons are towards the downward sides. The lengths of electrons become nearly halfway to the mid of their occupied energy knots. In the liquid state of a solid atom, the infinitesimal displacements of the electrons are towards the upward sides. The lengths of electrons become nearly halfway to the mid of their occupied energy knots.

Solid atoms of different groups enlisted in the periodic table undertake different transitions. Different groups of atoms could undertake different energy and force relationships. So, a significant difference in the energy and force relationship can be anticipated. However, within the same group of elements, atoms' energy and force relationship match to a large extent. A discussion on similar lines can be anticipated for the gaseous atoms enlisted in the periodic table.

The formation of atoms in different elements is in the zones allocated. An electron is not discussed in the context of a negative charge. An electron is discussed in the context of a particle. Particles of the minimum size make the electronic structure, where the electron acts as the concrete unit of mass. The exerting of different forces on the electrons drives an atom's function.

In the formation of certain natured atoms, some of the energy knots neither work for filled states nor for unfilled states, which remain folded by neighboring chains of energy knots. Folded energy knots in different chains are shown in the atomic structure of titanium [17]. In atoms of some elements, the pieces smaller in size than the electrons can trap in the regions of zeroth rings. Many overt photons are intercrossed under a particular scheme by keeping the centers at a common point, so they shape a required number of chains of states in an atom. Only four electrons of complete shape and size are eligible to settle in their associated energy knots, shaping the zeroth ring in an atom. Therefore, in certain behavior atoms, particles of the fractional sizes of an electron may be trapped in the folded or compressed energy knots, not working for the filled and unfilled states. However, more minor than electrons, the broken pieces of matter can further diversify particle physics and neutrino physics.

When the electrons get jammed in the occupied energy knots under the pieces of heat energy, the atoms of transition states cannot deal with the elastically-driven electronic states [18]. On interaction with the electronic tip of the atom, a photon is reflected under the impact of absorption, studying photon-matter interaction [19].

The energy knots are required to clamp the electrons in an atom. Forming the tiniest matter and nets of energy knots to shape atoms requires a suitable environment. The formation of atoms locates an environment depending on the characteristics. The nature of the atoms in different groups is different, categorized by named classes – gaseous atoms, inert behavior atoms, semisolid atoms, and solid atoms. The formation of atoms is according to the conditions required to grow in different elements.

Shaping energy knots to clamp electrons is an extraordinary process. Atoms of different elements can grow in suitable places or zones. Atoms of the gaseous states can grow above ground level. Therefore, astronomers, environmentalists, chemists, space scientists, and those working in the allied areas may look into the nature of growing those atoms. Atoms of the semisolid states can grow at the ground level, so electrical engineers, earth scientists, physicists, environmentalists, and those working in the allied areas may look into the nature of growing those atoms. Atoms of the solid behaviors can grow below the ground surface, so metallurgists, geologists, chemical engineers, chemists, paleontologists, and those working in the allied areas may look into the nature of growing those atoms. Some detail about this study is also given in the Supplementary Information.

Conclusion

In all elements, atoms are formed by energy knots and electrons. Energy knots constructing filled and unfilled states in an atom are shaped by the precise intercrossing of overt photons with fixed lengths and numbers. Lengths and numbers of intercrossed photons are according to the states an element specifies for its atom. In the intercrossing, overt photons keep the centers fixed at a common point where shaping energy knots clamp the electrons. Atomic lattice constructs by intercrossing overt photons in a specific scheme in any element.

Except for hydrogen, atoms of all elements keep their zeroth rings. A zeroth ring is related to the central ring, where four electrons are occupied by the four energy knots. An atom does not require protons and neutrons to define the nucleus. At the place of orbits or shells, the shaping of rings can be imagined. An atom in any element keeps the zeroth ring and the number of rings required to secure the filled and unfilled states. The atomic structure of helium is identical to the zeroth ring. One more electron is required in a hydrogen atom and one previously designated. A hydrogen atom is formed by clamping two electrons by the shape of digit eight. A hydrogen molecule is formed by joining two hydrogen atoms but not like how a helium atom is formed.

In gaseous atoms, electrons keep more than half of their length above the mid of occupied energy knots. In solid atoms, electrons keep more than half of their length below the mid of occupied energy knots. Gaseous and solid atoms, when undertaking transition states, their electrons deal with infinitesimal displacement by remaining within the occupied energy knots. In the liquid states of gaseous atoms, electrons deal with infinitesimal displacements downward. In the liquid states of solid atoms, electrons deal with infinitesimal displacements upward. Gaseous atoms undertake transition states by gaining transitional energy, where levitational force exerting on the electron functions in an inversely proportional relationship. Solid atoms undertake transition states by absorbing the transitional energy, where gravitational force exerting on the electron functions in a directly proportional relationship.

Estimated orientations of the electrons in gaseous atoms when in the original, recovery, and neutral states are along the 40°, 20°, and 5°, respectively. These orientations are from the right sides to the normal lines drawn from the centers of right-positioned electrons and from the left sides to the normal lines drawn from the centers of left-positioned electrons. Estimated orientations of the electrons in solid atoms when in the original, recovery, and neutral states are also along the 40°, 20°, and 5°, respectively. However, the orientations of electrons are monitored from the south poles. The orientations of the electrons are ~ 25° and 50° along the north pole when the gaseous atoms are in the re-crystallization and liquid states, respectively. The estimated orientations of the electrons, when the solid atoms are in the re-crystallization and liquid states, are ~ 25° and 50° along the south pole, respectively.

The transition of an atom is usually out of the environment that an atom takes in the original state. An atom undertakes a transition under the amount of chemical energy. In the transitional behavior of the gaseous atom, the tilting of left-positioned electrons is clockwise, and the tilting of right-positioned electrons is anti-clockwise. The tilting is from the north side. In the transitional behavior of a solid atom, the tilting of left-positioned electrons is anti-clockwise, and the tilting of right-positioned electrons is clockwise. The tilting is from the south side. Gaseous and solid atoms deal with different chemical activities and transition states due to different energy and force behaviors.

This study deals with the preliminary discussion about the formation of atoms and establishing the relationships between their force and energy under transitional behaviors. The presented scheme of atoms allows one to develop atoms with different lattices and electrons, so it works for a new diversity of matter. Therefore, there is vast room to conduct experimental and theoretical research. The presented investigations here may lead to attest sustainable utilization of resources.

Declarations

Acknowledgment:

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Conflicts of interest:

The author declares no conflicts of interest.

Data Availability Statement:

The work is based on the fundamental science of atoms and material at different scales.

References

1. M. Ali, Atomic Structure and Binding of Carbon Atoms. (2021), https://www.preprints.org/manuscript/201801.0036/v11

2. M. Ali, Atoms of None of the Elements Ionize While Atoms of Inert Behavior Split by Photonic Current. (2022), http://arxiv.org/abs/1611.05392v28

3. 20. M. Ali, I–Nan Lin. Forces driving amalgamation of nanoparticles and particles in solution. Forces in Mech. 7 (2022) 100076.

4. M. Ali, Tiny-Shaped Particles Developing a Mono Layer Shape Dealing with Localized Gravity and Levity at the Solution Surface. (2022), http://arxiv.org/abs/1609.08047v29

5. M. Ali, Structure Evolutions in Atoms of the Elements Executing Confined Interstate Electron Dynamics. (2022), http://arxiv.org/abs/1611.01255v28

6. M. Ali, Heat and Photon Energy Phenomena: Dealing with Matter at Atomic and Electronic Level. (2021), https://www.preprints.org/manuscript/201701.0028/v11

7. M. Ali, I–N. Lin, Development of Gold Tiny Particles and Particles in Different Sizes at Varying Precursor Concentration. *Adv. Nat. Sci.: Nanosci. Nanotechnol.* 11 (2020) 015006.

8. M. Ali, I–N. Lin, Controlling morphology-structure of gold tiny particles, nanoparticles and particles at different pulse rates and pulse polarity. *Adv. Nat. Sci.: Nanosci. Nanotechnol.* 10 (2019) 025015.

9. M. Ali, I–N. Lin, Formation of tiny particles and their extended shapes: origin of physics and chemistry of materials. *Appl. Nanosci.* 9 (2019) 1367-1382.

10. M. Ali, I–N. Lin, C. -J. Yeh. Tapping Opportunity of Tiny-Shaped Particles and Role of Precursor in Developing Shaped Particles. *NANO* 13 (2018) 1850073 (16 pages).

11. M. Ali, I–N. Lin, C. –J. Yeh, Predictor Packing in Developing Unprecedented Shaped Colloidal Particles. *NANO* 13 (2018) 1850109 (15 pages).

12. M. Ali, I–N. Lin, Phase transitions and critical phenomena of tiny grains carbon films synthesized in microwave-based vapor deposition system. *Surf. Interface Anal.* 51 (2019) 389-399.

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

14. M. Ali, M. Ürgen, Morphology and Structure of Carbon Films Deposited at Varying Chamber Pressure. (2022), https://arxiv.org/abs/1802.00730v20

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

16. 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.

17. M. Ali, E. Hamzah, M. R. M. Toff, Hard coating deposits: incompatible working energy and forced behaviors of gaseous and solid atoms. *Adv. Mater. Process. Technol.* (2020), https://doi.org/10.1080/2374068X.2020.1822055

18. M. Ali, Transition Energy, Orientation Force and Work Done in Transitional Behavior Atoms: Formulating New Principles in Thermodynamics. ChemRxiv,

Preprint. https://doi.org/10.26434/chemrxiv.11553057

19. M. Ali, I–N. Lin, Gold Nanostructures and Microstructures with Tunable Aspect Ratios for High-Speed Uni- and Multidirectional Photonic Applications. *ACS Appl. Nano Mater.* 3 (9) (2020) 9410-9424.

Figures

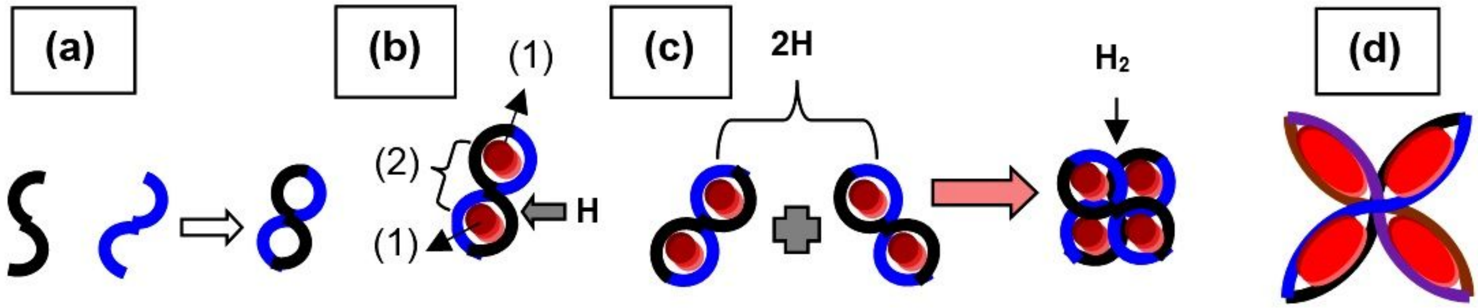

Figure 1

(a) Formation or construction of energy-knot-net in H atom. (b) Structure of H atom; (1) electrons and (2) energy knots. (c) Hydrogen molecule. (d) Structure of helium atom

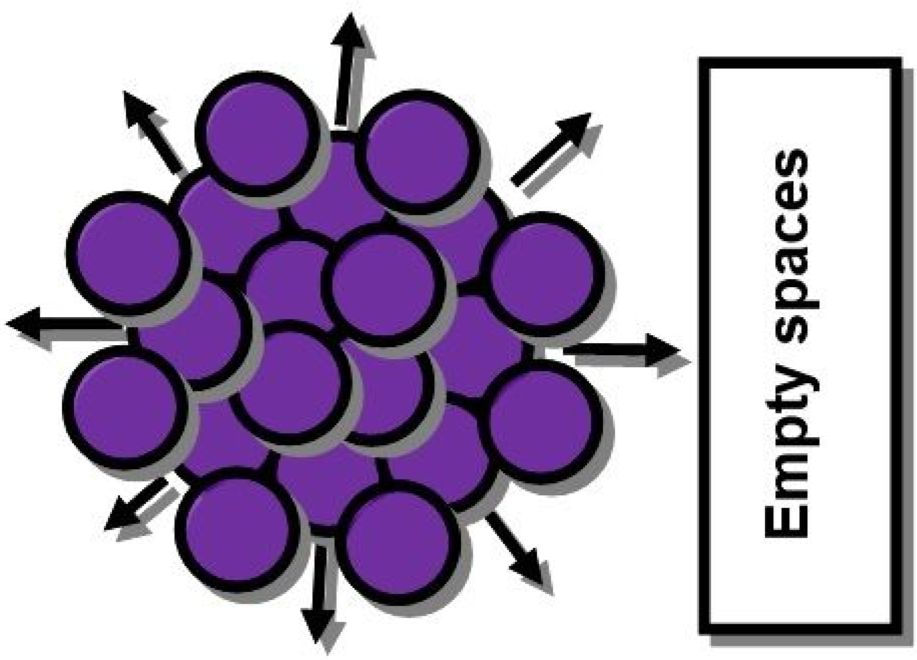

Figure 2

Empty spaces in argon atom indicated by the arrows having length short by a unit photon at both ends of the constituted chains

Figure 3

Atomic structure of lithium; 1, 2, 3 & 4 – energy storage regions, 5 – zeroth ring, 6 – outer ring, 7 & 8 – chains of states, 9 – filled state electron and 10 – unfilled state or empty energy knot

Figure 4

Generalized relationship between energy and force in transitional behaviors atoms when **(a)** gaseous to liquid and liquid to gaseous and when **(b)** solid to liquid and liquid to solid

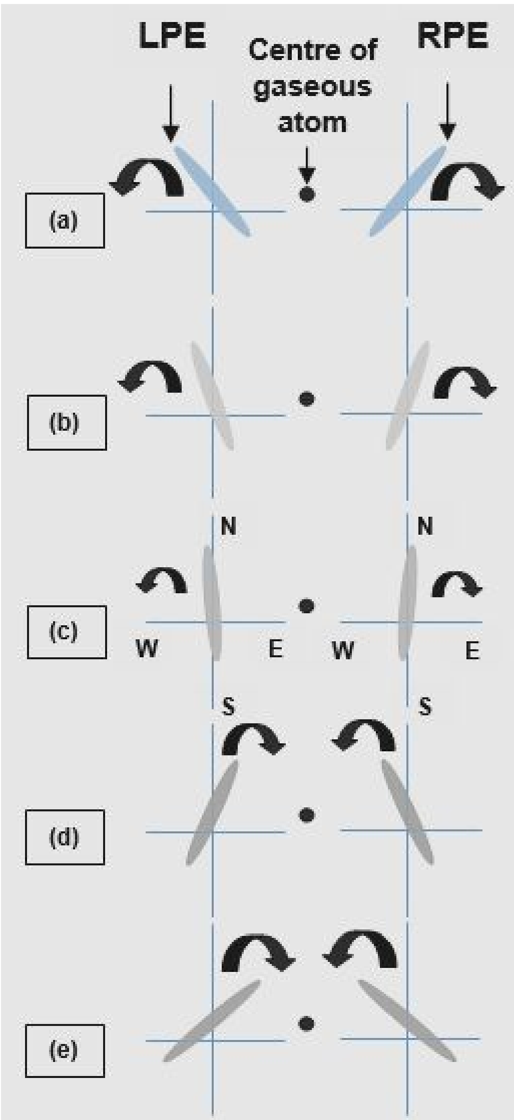

Figure 5

Left-positioned electron (LPE) and right-positioned electron (RPE) to the center of the hypothesized gaseous atom showing different orientations along the north pole when in (a) original state, (b) recovery state, (c) neutral state, (d) re-crystallization state, and (e) liquid state

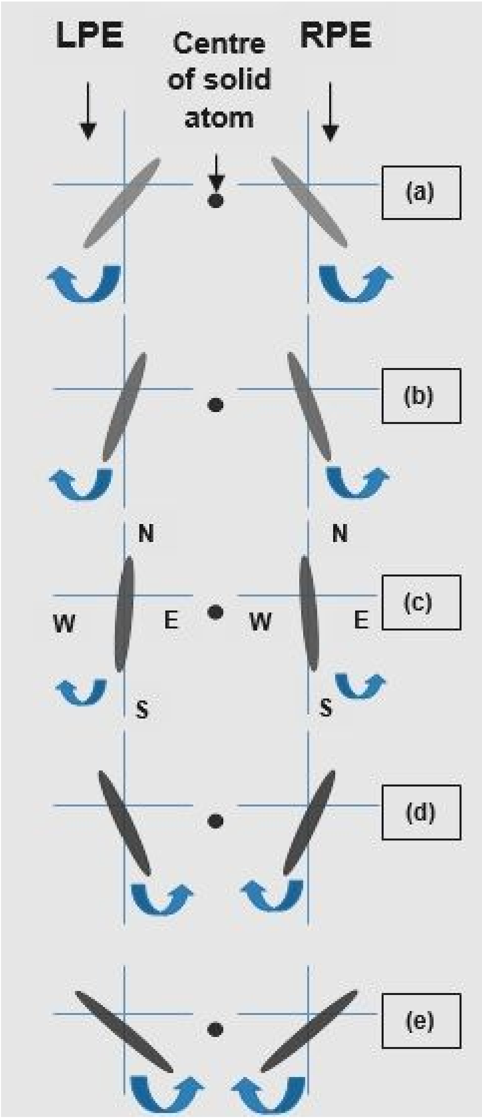

Figure 6

Left-positioned electron (LPE) and right-positioned electron (RPE) to the center of the hypothesized solid atom showing different orientations along the south pole when in (a) original state, (b) recovery state, (c) neutral state, (d) re-crystallization state, and (e) liquid state

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