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Derivative finding of calcium Carbate CACO4 in white marble soft stone bonded by CAO4C

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Abstract
The soft white marble however, seems physically appearing as CaCO3. While white marble powder can be obtained naturally from inside the earth's surface only. But CaCO3 remains available by industrial production chemically and is mainly used in chemistry laboratories for the sake of carbonate radical test. Hence CaCO3 is found to be chemically very reactive with dilute sulfuric acid. Although the white soft marble powder, which is seen to be a similar type of powder by physical visualization but, it does not react so with sulfuric acid. Therefore, the presence of CO3 carbon tri oxide nominated as carbic oxide can be treated to exist inside the chemical composition of white soft marble bonded by CaO4C and formulated by derivative finding as CaCO4. The argument for the formation of CaCO4 is supported based on a composite type of bonding between CaO and CO3, which may be acting due to geological pressure faced by its constituents to attain the position of the equilibrium state of existence. This reaction is analogous to well-known solid-state thermal physico-chemical reaction in between CaO and WO3 while preparing CaWO4 in the micro crystalline form. The white marble powder can be directly used as a bleeding stopper medicine due to the presence of Ca^{2+} ions in it for protecting the wound by clotting mechanism of thrombin.

Keywords: Carbon mono, di and tri oxides, hard lime stone, soft white marble stone, calcium oxide, calcium carbonate, tungstic oxide, carbic oxide, calcium tungstate, calcium carbate, chemical bond, sulfuric acid.

1. Introduction

White soft marble of calcium compound cannot be treated as CaCO3 because however, the physical properties such as visualization and smoothness of both the powders are similar, but the chemistry of white marble does not match with CaCO3. White marble powder is observed to be inactive chemically to react with dilute H2SO4 while CaCO3, which is a laboratory's chemical is seen to be very reactive with dilute H2SO4 to show carbonate radical test present in CaCO3 by the involvement of the following chemical reaction [1].

CaCO3 + dil. H2SO4 = CaSO4 + H2O + CO2

The occurrence of white soft marble stone is found naturally inside the surface of the earth while CaCO3 is associated with the hard rock stone. Lime powder is obtained by heating this so-called lime stone. When the lime stone is heated at about 1200 °C, the stone becomes white in colour due to ejection of CO2, and by formation of pieces of lime CaO. Due to providing CaO, the rock stone is termed as calcium carbonate rock due to the origination of CaO and CO2 involved in the following chemical reaction [2].

CaCO3 ----------heating ------- CaO + CO2

The history of lime water Ca (OH)2 is related with CaO by the following chemical reaction.

CaO + H2O = Ca (OH) 2

CaCO3 is prepared by passing CO2 gas through lime water by the following chemical reaction [3].

Ca (OH)2 + CO2 = CaCO3 + H2O

The structural formation of white marble is unique, therefore, in this regard of investigation. To deal with this anomaly, a new concept of the involvement of another type of calcium carbate (CaCO4) compound is believed to exist by a comparative study with similar type of other calcium compound known as calcium tungstate (CaWO4).

2. Experimental

Naturally occurring white soft marble stone on earth's surface is available at large scale in Kumaun and Garhwal region of Uttarakhand state in India. The soft marble and its powder is shown in figure 1. It is experimentally tested that the powder can be used as a bleeding stopper due to the presence of calcium species in it. Ca^{2+} is helps to stop bleeding through clotting mechanisms, which also protects the place of the wound from further bleeding and related infection phenomena. Calcium is thus predicted to be definitely associated with the powder so far concerned with this investigation. Most of the lighting bulbs are evacuated so that oxygen could not remain inside the bulbs otherwise, metals in its thermally hot state react with oxygen and make oxides. The elements of the resistance coils thus get destroyed. Most of the tungsten bulbs have low lifetime only due to this cause, but in some cases, the bulbs also get fused by the higher voltage, and the temperature gained out of tolerance. It is well known that tungsten in its hot state reacts with oxygen and converts into tungstic oxide (WO3) by the following thermo-chemical reaction –

2W + 3O2 = 2WO3 (yellow powder)

The occurrence of oxide powder is stable and the chemical substance also remains available in chemistry laboratories. When the chemicals CaO and WO3 are kept in a platinum crucible and are heated in an electric furnace at a temperature of about 1200 degrees centigrade; CaO is found to combine with WO3 to make CaWO4 crystalline powder. The blue-green fluorescence of Ho^{3+} and Er^{3+} can be controlled by doping the ions in such a low phonon energy W-O bond available in calcium tungstate phosphor. Thus, the association of CaO with WO3 is resulted combined in the form of CaWO4 by the following physical thermo chemical reaction [4].

CaO + WO3 ------- Heating ---------- = CaWO4

The main attention of the above experimental study is focused on attempts of similar findings of the role of CO3 to play with CaO in view to emphasize the occurrence of the structure of molecular bond in CaCO4.

3. Results and Discussion

It is well known that carbon makes CO and CO2 with oxygen, but its third most unknown oxide CO3 seems to play a significant role to restructure in the form of CaCO4 as a result of binding with CaO. In this investigation, the bonding in CO3 is correlated with the study of bonding in WO3 through various disciplines. The electronic configurations of C, O and W, which make oxide of such type, are summarized below [5].

6 C = $1s^2, 2s^2, 2p^2$

8 O = $1s^2, 2s^2, 2p^4$

74 W = $1s^2, 2s^2, 2p^6, 3s^2, 3p^6, 4s^2, 3d^{10}, 4p^6, 5s^2, 4d^{10}, 5p^6, 6s^2, 4f^{14}, 5d^4$

The yellow powder of WO3 shows that W has its valency 6 concerning valency 2 of oxygen in WO3. W is assumed to be surrounded by three oxygen atoms. The existence of WO3 brings one to derive the bond with the help of $6s^2$ and $5d^4$ electrons of the electronic configuration of tungsten atom. The total of 6 electrons of $6s^2$ and $5d^4$ electronic levels of tungsten atom are donated to nearby three oxygen atoms. Out of 6 electrons, two of the electrons are captured by each of three oxygen atoms, respectively. Figure 2 exhibits how the electrovalent bonding becomes possible for the formulation of WO3 compound molecule.

Similarly, the possibility of electrovalent bond seems to be plausible in the case of CO3, which plays a significant role in binding CaO in the form of CaCO4 white marble molecules. As in WO3, W has a valency of six, in the same manner, C may also have a valency of six in CO3 type of molecular bond. Figure 3 shows that the donation of electrons from the various sub orbits of $1s^2$, $2s^2$, and $2p^2$of carbon can play a dominant role during the donation of total six electrons. Out of six electrons donated from the various electronic configuration of C, two electrons are given to each of three nearby oxygen atoms for getting to change the electronic configuration of each oxygen atom from $2p^4$ to $2p^6$. The carbon atom, in this case, donates six electrons to find itself in the form of a positively charged nucleus while each of the oxygen atoms is ionized by a negative charge of two units. Thus, three similar types of oxygen ions makes a single assembly, which consists of a total negative charge of a six units. This assembly of negative charge surrounds the carbon nucleus which consists of a total positive charge of six units. The electrostatic force of attraction between charged ions becomes dominant to make nucleo - electrovalent bond in nature to exist CO3 to play it's a role in the chemistry of CaCO4. In other words, we can say that each of the oxygen ion comprising negative charge is attracted by the positive charge of the carbon nucleus. If CO3 is possible to appear in such a way, CO3 can also make CaCO4 with the combination of CaO, as WO3 is found to use CaO for making a bond for CaWO4 molecule.

The similar bonding can be expressed by the following chemical reactions as-

CaO (calcium oxide) + WO3 (tungstic oxide) = CaWO4 (calcium tungstate)

CaO (calcium oxide) + CO3 (carbic oxide) = CaCO4 (calcium carbate)

However, the formation of WO3 and its reaction with CaO has been realized experimentally, but in case of CO3, neither it is so familiarly available nor is experimentally fabricated. Still it is applied to formulate bonding inside the structure of soft white marble. Due to the presence of Ca^{2+} and expected resemblance of bonding as appeared in CaWO4, the bonding structure of CaO molecule which plays the most important role in using CO3 assembly for the formation of CaCO4 type of substance is shown in figure 4.

The geological distribution of substances of inorganic minerals present at any place on earth can be understood based on gravitational pressure exerted by the earth, which differs from place to place due to slight change of density and shapes towards. The electrostatic force of interaction among the charge constituents can be considered to have played a very important role in making a mineral for its the equilibrium state of existence. Because it is well known that every type of mineral ores are not associated with everywhere. The earth is the home place for finding the structural composition for bonding of chemicals involved with the mines. Thus, the geological chemistry of composition of the earth surface given its structure and bonding between its constituents to exist in the presence of gravitational pressure is unique. Every possible bonding between constituents of naturally occurring mineral occurs in such circumstances for finding the physical appearance.

It seems that the CaCO4 is composed under geological physical chemical reaction. During the formation of this mineral, CaO is forced to pick up the nearby bunch of CO3 bonded structures until the equilibrium state of occurrence in the form of CaCO4 is achieved. Figure 5 gives the idea of binding of CaO with CO3 by a very simple mechanism which depends only upon the attractive forces acting among the charged constituents. As it is clear that Ca^{2+} ion of CaO bond and carbon nucleus of CO3 bond both are positively charged constituents, hence cannot remain closely in front of each other. At the same time, each of the three oxygen ions of CO3 bond, as well as one oxygen ion of CaO bond, consists of a negative charge of two units. These four negative ions of oxygen bunch take the positions in a mid between Ca^{2+} and carbon nucleus; hence are mutually attracted from both sides. Both Ca^{2+} and carbon nucleus is also attracted by each of the oxygen ions, while each of the oxygen ions is attracted by Ca^{2+} as well as by carbon nucleus. In this way, four oxygen atoms in their ionic state play a dominant role in building a bond with calcium ion as well with carbon nucleus. Owing to above facts, it can be said that the soft white marble is no more any other compound rather than CaO4C mineral ore in which the bonding can only be understood based on its constituents CaO and CO3 as present in the molecular formula of CaCO4.

Fig 1: The white powder of soft marble stone by grinding with the help of a knife or hand grinder.

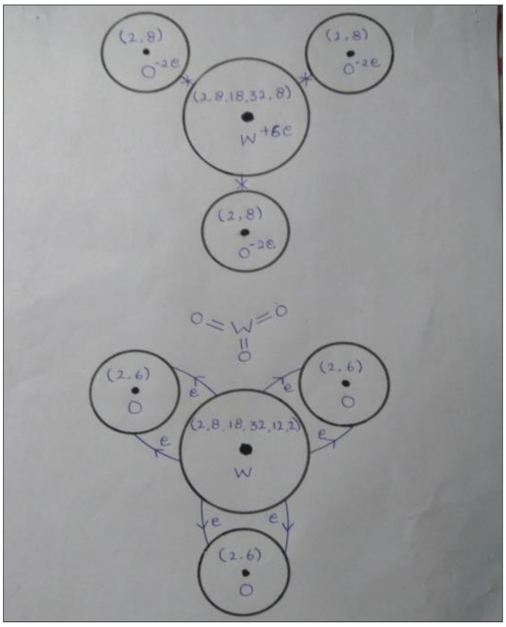

Fig 2: Demonstration of electrovalent boding for the formation of the WO3 molecular structure.

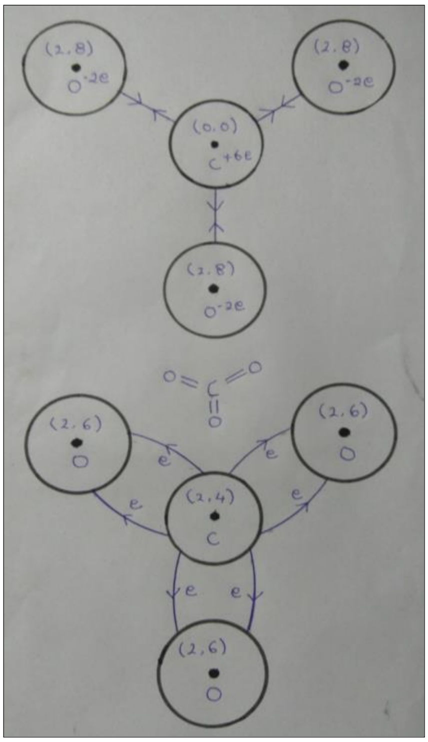

Fig 3: Demonstration of Nucleo electrovalent bonding responsible for the role of CO3 structure.

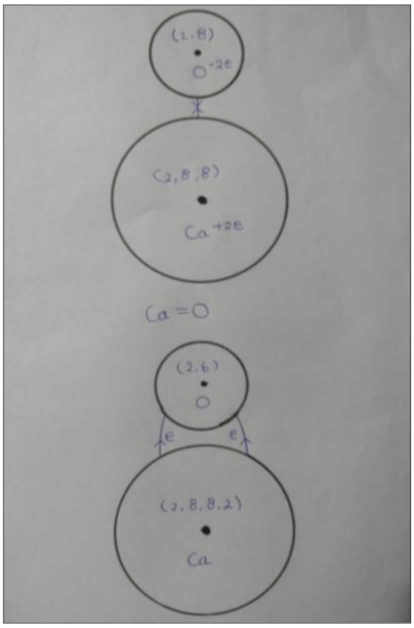

Fig 4: Demonstration of formation of bonding structure of CaO molecule.

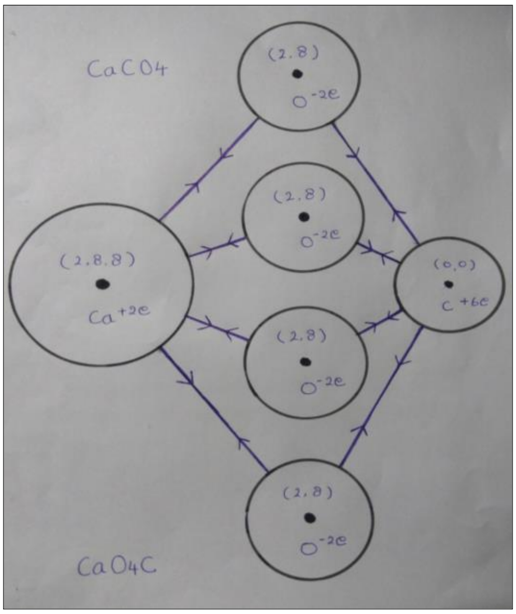

Fig 5: Demonstration of attractive forces of binding among constituents of CaO4C white marble.

4. Conclusion

White soft stone marble's (CaO4C) history of formation is finally achieved by a satisfactory mode of investigation. The stone is very easy to grind into powder form, and the powder made so is very useful medicine to stop bleeding further and to prevent from infection phenomena already described in the history of medical science.

5. Acknowledgement

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