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Growth of Silicon Carbide as a Ceramic Structure

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Abstract: Each state of scientific strategies must insist on manufacturing technology to define the challenges ahead and find solutions to them. This solution can stem under the plan, prospects based on short-term and long-term development and prioritized research will be done. Today the Ministry of Economy and Industry, which are guaranteed by these institutions on the value added goods and products, which are at the nanoscale, head science projects and enterprises. Thus, certain criteria related to value-added side impact nanoscience technology scientific and economic security is crucial here that using business practices to invest in developed countries, for the policies we need to start production on track and we recommend nano.

Key words: Nano · Silicon · Ceramic · Growth · Ceramic Structure

INTRODUCTION

If the amount of funding in the country's advanced spatial and energy program on developing the nanostructure engineering and nanomanufacturing costs we have to see that the nanotechnology areas is one of innovation, the innovations and products in this background have a big impact on the economic plan and budget. One of the challenges related to the semiconductor industry structure, which has nano miniature chips since tools and electronics industries need time, of about 10-6 that year, until the mass production of nano-engineered elements with benefit and capacity to be addressed and be fully understood in making business. Investigations are necessary and the deep impact on all the products related to upcoming cars, coatings, detergents, fuels, power generator, sensors to power engineering projects. References are few manufacturing strategies in the nano-economy countries like China, Korea, France, Australia, America and several other countries to discuss and take related measures in the privatization process with little disruption and to some extent by the national and geographic areas to be determined. This is due to the emerging field of nanotechnology in the world and especially related to its infancy in third world countries and developing countries and the only approaches of the faculties of the Humanities, Sciences and Business Economics are very limited [1-5].

Applications of Nanoceramics with Silicon Carbide Growth

Coating: One of the most important applications of nanotechnology is silicon carbide ceramics which is with the growth of a "coating". When some nanoceramics with silicon carbide growth is poured on a surface, it can cover all levels. For example, if ground gypsum powder is used and the whole surface is covered with a homogeneous white surface comes into existence. However, in this case are still much planning spaces between powders there, ie not integrated coverage. Now we add some water to the plaster and we wait to water by dry heat. We see that the powder particles bonded together and a homogeneous coating on the surface there is. By nano-based coating ceramics with silicon carbide growth is also exactly the same, ie., nano-silicon carbide ceramics with the growth and after coming to the surface by an additive factor (mainly oxygen or argon gases, water in the same role play eg., gypsum) and heat the particles until a coating over time is integrated on the surface occurs. A dashboard coating machine is produced in exactly this way [5-6].

Parts: As we saw, nanoparticles of silicon carbide ceramics with the growth of that great attraction to stick together like magnetized iron filings. On the other hand the desire to pressure nano-silicon carbide ceramics with the growth temperature greatly increases and therefore, pressure and temperature rise can be nano-silicon carbide ceramics with the growth so much together and pressed

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to stick together to produce a piece. The method for producing parts mainly with complex shapes are used (this phenomenon normally occurs in salt. If the certain amount of salt remains, after a while the salt particles bonded together salt and other salts are not playing. Therefore, salt should have some impact and we arrive at the particles to be separated from each other).

Using the Worms: As you might know, nanoceramics with silicon carbide particles grow to 100 nanometers in diameter are one. When these particles are used in making cream because their diameter is small, harmful sunrays, which wavelengths are larger than one hundred nanometers do not pass. Meanwhile, the visible light rays, which are seen to be parts of your pass. Therefore, be seen as transparent. In this case, we have the worm, which is transparent and the harmful rays do not pass [6-7].

Identification of Contamination: the nanoparticles of silicon carbide ceramics with the growth of the form, using the properties of its surface, when a solution containing the contamination (eg., bacteria, carcinogenic cells, etc.) are added and bonded on the pollution caused by their reaction with color change and give cause that they are then identified. Of course, any particle smaller than that obtained from the observed color change, but with changes in the color of these particles, pollutants are detectable. As an example of application of nano-silicon carbide ceramics with the growth that has brought the structure of silicon nanoparticles in solution, oil droplets are identified and some of the liquid penetration into their gaps, discoloration and they the detected target, altogether.

Nanotechnology with the Growth of Silicon Carbide Ceramic Crowns: Metals and ceramics are generally crystalline, i.e., areas of dense or crystalline grains are formed with a random arrangement. Decreasing grain size (or in other words crystals) in bulk materials can be a big effect on the properties they have. The example of a metal grain size in the nano scale to eat, more than solid atoms are located at grain boundaries and the behavior of atoms in the grain boundary behavior in female mass is different. For example, approximately 5 nm, 50% of volume of material at the border. Keep in mind that a nano-crystal material should not necessarily be a solid mass, but can be a powder and therefore the term nanocrystals and nanoparticles are partly overlapping. However, an important general property of nanocrystalline nanoparticles (such as semiconductor quantum dots) of the nano particulate nature that comes from them does not fit in this topic. The focus of this report on nano-crystalline material is massive. However, nanopowders can build solid source and crowns are nanocrystalline [8].

Any expression that is often higher than the grain size to nanoscale desire, stronger and harder metals (and fragile) and ceramics are coming with more flexibility. However, this is just an estimate and reality is very complex and depends on the grain size which is located part of the nanoscale. For example, the above expression for the metals to grain size of about 10 nm is true, then decreased stiffness and strength of metals. Flexible ceramics in nano crystalline grain size is often less than this amount. Hardly change with the conventional theory of the relationship between grain size "Hull patch" is known. This relationship states that the hardness, the relationship is inverse square root of grain size (based on the effects of emissions limits in place crack in the crystal structure is the increasing number of grain boundaries). The issue of extraordinary hardness increased with decreasing grain size amounts to about 10-20 nm is normal, but the only way to control the spread of grain size of the place is build layers of a material that can do this. Other properties of nanocrystalline metals, the last of increasing strength and stiffness include increasing the electrical resistance, specific heat capacity, improved thermal expansion properties, decreased thermal conductivity and improved magnetic properties [8-10].

In ceramics, besides increasing flexibility, improving stiffness (the ability to persevere against impact or strain) or decrease the brittleness and improve connectivity with a metal component is associated. Stiffness increased wear resistance (2 to 4 times the conventional ceramic crowns) but is also milled opposite way and polishing them often after the creation of a ceramic coating is performed is easier. Increased flexibility in ceramics - the fragility of the major problems is one of them - is important. Cloud plasticity (factor shaping easier material) in both nanocrystalline metals, ceramics approximately 200°C has been viewed. The most important effect on increasing flexibility in Ceramics ceramic crowns machinery is exposed to erosion and corrosion. The material mainly not because of erosion due to inadequate stiffness defects is found. Research on nanocrystalline ceramic crowns are promising new materials such as silicon carbide and stable have been investigated.

Nano-crystal silicon carbide ceramics flexibility into the possibility they can provide wire, to form the superconducting properties of silicon carbide ceramics, some used. In metals, the most important phenomenon of increasing strength and hardness increase could be a problem, because not only flexibility in manufacturing is helpful, but also the behavior of the object to hit - like the behavior of vehicles in an accident - is also effective [11].

Different strategies while maintaining flexibility and increasing strength steels there. Ordinary steel with carbon particles is offal. NKK group in 2001 in Japan, a way to insert nanoparticles of silicon carbide to steel during the rolling process were that the smaller the entrails of her and thus the strength of steel would greatly increase, while ductility was enough ability to build components body or engine parts used. Toyota, which had been compiled in this project, it now uses this new steel. Crystalline structures of silicon carbide can be made amorphous metals - such as glass structures at the atomic level that are no disorder - also created. 2001 National Engineering and Environmental Laboratory Idaho U.S. Energy Ministry spraying a coating of amorphous steel that develops very hard and resistant to corrosion and proved the best cover elastic limit is silicon carbide (applying the coating can be heat Amorphous nanocrystals took the form). It also covers 45% of theoretical maximum strength and hardness, however so far only the crowns are made of steel [12].

Nano-silicon carbide ceramics with the growth due to its unique usability features in various applications possess. Using nano-silicon carbide ceramics with the growth in semiconductor devices can be produced using conventional materials will not be able to produce them. With the growth of silicon carbide, nanoceramics in the tire industry in addition to causing weight loss properties of tires needed to dramatically increase. Although the initial cost of using nanosilicon carbide ceramics with high growth, but growth performance of silicon carbide nanoceramic long time has caused their use is economically justified, although adding new methods of synthesis of the initial costs Nanosilicon carbide ceramics with growth also declined.

Spectroscopy

Sample Electron Spectroscopy (Auger Election Spectroscopy): Samples electron spectroscopy (AES) in 1960, this technique has been proposed because Piurre Auger initiated the first time. Mentioned techniques for emission levels that low-energy electrons are used most and how the levels of certain chemical compounds and surface layer structure sample is thereby possible.

Physical Concepts Associated with this Technique: Auger spectroscopy can be raised by some steps includes Atomic ionization (by a separate core electrons), electron emission (Auger process) and final step as An analysis of electron emission Auger. The final step is a fundamental issue that can be used with this technique; charged particles that are sensitive to the surface can be based on the kinetic energy of electrons emitted material structure and composition of the samples obtained.

Electronic Structure-Atoms Isolated: Different levels of energy-isolated electrons are briefly described in Figure 1. Electron atoms in the conventional chemical nomenclature for the orbital are for the right hand side. On the other hand, scientific work with X-ray determined that periodic named on the left hand side are used and the name that is used is Auger spectroscopy.

Electronic Structure-Solid State: Mode solid core levels of atoms is a little confusing and a separate state levels remain Rebel though the orbital Valens significantly with established bands adjacent atoms overlap in their energy levels (Figure 2).

Auger Spectroscopy: Here the subject of Auger spectroscopy returns. Auger process mainly balances L_1 and $L_{2,3}$ and K to be employed. Inner core levels can be an atom in a molecule in the solid environment to be exposed.

Ionizing Auger: Auger process by creating core holes was founded. In this way the samples exposed to radiation with a beam of high-energy electrons are located is the primary energy of about 2-10 Kev (Figure 3).

The figure 3 showed above shows ionization which electrons to be dug into the K layer. However, in practice such a crude method leads to ionization of ions with holes in different layers of internal balances. Example can be a primary ionization process by which X-rays with energy E = 1.2Kev noted that in this case is better XAES symbol should be used, but noted that there exist in X-ray does not come in a significant impact on the final Auger spectroscopy.

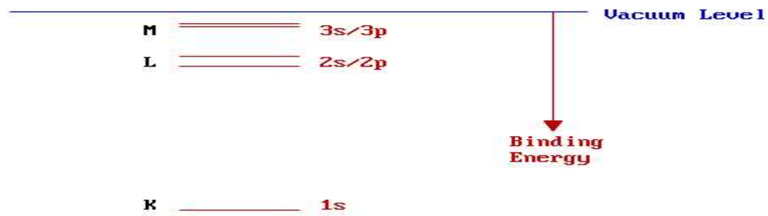

Fig. 1: Electronic structure - atoms isolated

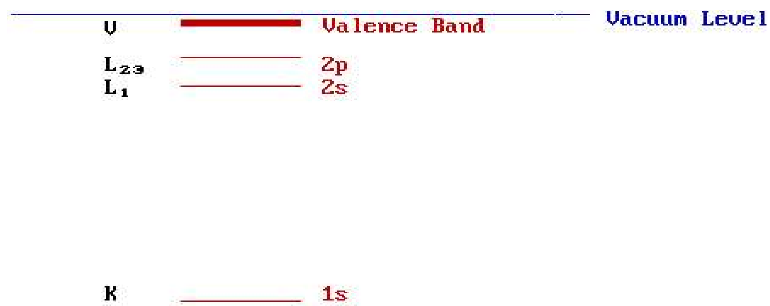

Fig. 2: Electronic structure - solid state

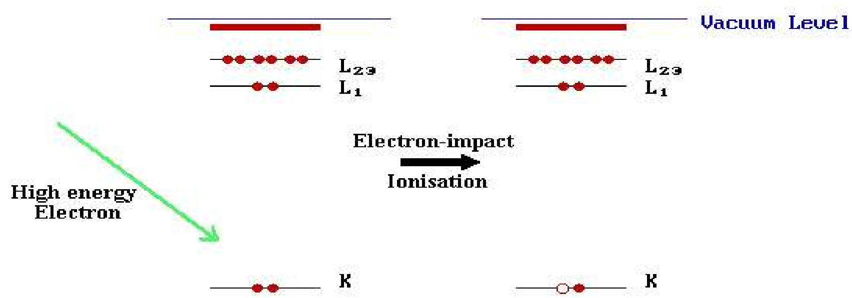

Fig. 3: Process of Ionizing Auger

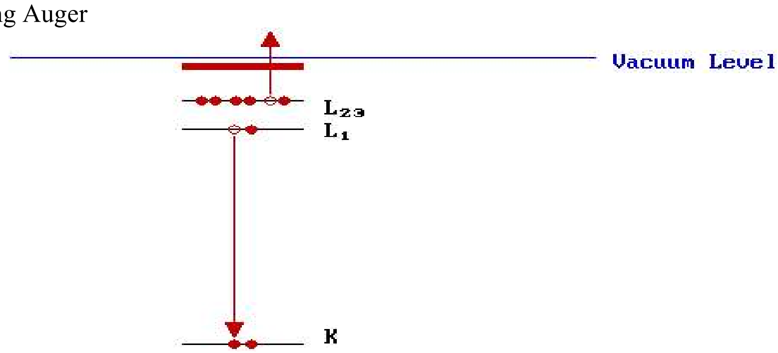

Fig. 4. Walsh Auger process

Walsh Auger Process: According to the quantum selection rule comes to be, i.e., When the hole in the K balance is created when the hole with the electrons can be high levels of ionized atoms that after the separation of the core hole electrons arise in metals easily an quick and low-energy state with one of the two methods occurs that are X-ray fluorescence and other is radiation Auger. We continue with another observation and will examine an example, which is highlighted in the Figure 4.

After a full balance of electrons to higher initial core (layer K) and falls down while coming to the lower energy level releases the energy released in this process an electron can be more of the same level and other levels be given and if sufficient electrons to separate RNA level to set it free and that free electrons to electron Auger is known. Energy to overcome some of this linkage of energy (up) the second electron is required. The remaining amount of energy radiated by the electron kinetic energy is a maintained Auger. The method or process actually finishes on Auger ionized core holes in the layer $L_{2,3}$, L_1.

We estimate an approximate KE (depends on energy) of electrons in Auger having different levels.

$$KE = (E_K - E_{L1}) - E_{L23} \quad (1)$$

it is noted that KE electrons in Auger, apart from the core hole is the primary form of mechanism. We can also write an expression for such energy:

$$KE = E_K - (E_{L1} + E_{L23}) \quad (2)$$

Of course, this issue to the next energy speech that can make internal changes without any effect on light should be put here. In fact, electrons can not be dropped from the initial core hole electron detection Auger out because they say shall not comfortable with the process. After a transition, Auger naturally can be specified that at first we have to Place the initial two holes where the final two holes are. There are different modes in the electron double-ion-atom may lead to fine structure in high-resolution spectra to be. When we describe the transition where the initial hole is given in the first place followed by a second chamber depends on the energy account is final. Transition discussed is the $KL_1 L_{2,3}$ transition. If our balance of just three that clearly electron transition may consider Auger will consider them when set to be distinct modes as $KL_1 L_2$ $KL_1 L_{2,3}$ $KL_{2,3} L_{2,3}$. In general, the initial ionizing index cannot be the primary cause cavities, which may be present in different layers [11-15].

Solutions: According to factory owners of capital and other commercial business of the latest large scale and its treatment, the goal is to achieve nanoscales. Many researchers predict a signature on the claim that next year more than 30% of commercial and scientific instruments only with nanotechnology will be built. Meanwhile, officials of the U.S. health care in its new program have announced for the end of 2009 that more than 50% of health affairs in this country have been achieved by nanotechnology. National Science Fund, the financial value of trade from the top science by 2015 over a trillion dollars is estimated.

However, what we should do is our homework and to achieve the high-speed track and to define what is Nanoscience. In this paper, we have five solutions, which is more performance to introduce many years and nanotechnology is happily upon us.

First Solution: Minimal model for applying nanotechnology operations in 2008 to choose another time this year of investigation ended and the time has come to act. Manufacturing nanoproducts requires having the method and the Nobel Prize for having the executive group is not in our country. In recent years in the world, millions of products with the help of projects on nanoscience which and designed but that none has reached the stage of action.

It is interesting that when talking of nanotechnology products before making our mind comes to know of computer microprocessor or microbiological tubes is used. While in recent years, more than spend billions of dollars of textiles and textile production with the help of nanotechnology has been underway. Using nanocoating in electronic industry, video, glass, plastics and metals are one way to position products and enhance life, in contrast to facilitating cleaning chemicals. Nanotechnology is not necessary only in the computer system will search. Even this knowledge as a chef can also be flavored foods to enhance the storage period can be used [8].

Second Solution: At least three companies active in nanoscience and communicate with open aims to cooperate with the payment and it is past time for a single technology in science. Other findings should make the most wins and was waiting for new proposals. The way for Innovations to open this new lethal syndrome, that in most factories is called Innovation is enough and put this ideology aside. Many companies in our country wide research conducted in the field of nanotechnology has given enough thought are that it only be used. Also can be a fair partnership with them to exchange information and establish payment. We are now in the big world in which we live and other times we were on a single marketplace in the past. It is time for gaining a long-lost friend and to trust other companies in payments [9].

The Third Solution: That each conference will be held on nanoscience and at least three staff is to attend and to remember that we need a system, which is up to date in terms of Scientifics and to keep ourselves in the world's view. We can have nanoscience central events in the same conference with the latest news and get information to obtain this knowledge. Just participating in the conference facilities and capabilities horizon for the science is clear and the circles of a new spark, in our opinion, creates new science. In the conference is our considered the application of nanoscience in computer industry. Let us not ignore it, because originally, nanoscience base is not in the future products that will be built. In other words, the conference must become an "A to Z" road map of nanotechnology to let companies stay informed [11].

Fourth Solution: Let us not forget the university. Public universities and non-laboratory locations are suitable for discovering new strategies and maybe treasures in a bright future of this science. This to remember that the defect in our scientific resources is not restricted in terms of financial capital [11].

Fifth Solution: New companies and factories have various problems and issues to work with important resistance levels against our problems. Although Asian people are always said to be more diligent than other continents, are the total investment for the Asian promote nanoscience have made the country the size of North America. Remember that to achieve nanoscience involves many costs that must be addressed and requires a high price. Therefore, before you go looking for problems it can surprise us and we must have a coherent plan to solve any of them [12].

CONCLUSION

The paper stated relations in many issues deal with silicon carbide. So that the same was expressed in many areas of silicon carbide can know that this course was the obvious properties of this material dates back to early in the season compared with the typical properties of other similar materials used. That the important work done in this plan can be outlined to the film growth after an excellent cleaning substrate is silicon, on which the present process to ensure the parallel growth of silicon oxide on a silicon substrate with the spent Compare And to be free from any dirt sample is acknowledged. However, this study is the beginning and the need for accurate laboratory facilities are a good idea and to be able to do more testing in order to be confident in the results.

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