Active Nano Diamond Particles, Having Special Electronic Features, Are The Founders Of Completely New Types Of High-power Nano Electronic Devices

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Note: In nanoelectronic industries; Nano chip, increasing the speed of nano transistors, both types of diamonds, i.e. n and p type stones, are used for nanoelectronic applications in microelectronics. By adding "B" metal impurity to diamond, P type nano diamond can be made. That is, he produced blue diamonds and by adding phosphorus to colorless diamonds, he also produced n-type diamonds.

Nowadays, many semiconductors such as silicon are used in a wide range of nanoelectronic devices. However, due to the range of thermal changes and its extremely high speed, nano diamond is only compared to gold nanoparticles, which is the second best nano semiconductor in the world. Nano graphite and graphene nano strips are electrically conductive due to cloud scattering. Active nano diamond particles with such features, especially electronic ones, can be the foundation of completely new types of powerful nano electronic devices.

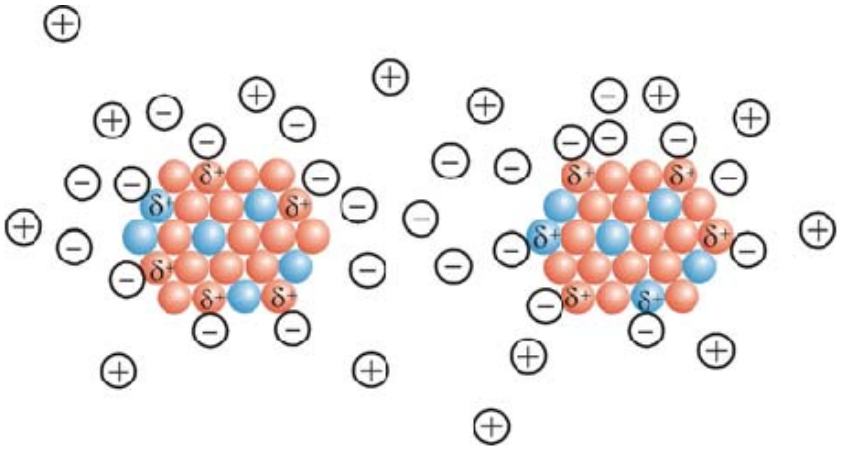

Figure 1: **nanoscience and nanoelectronics**

Diamond is made of only one element found in nature, carbon. Diamond has a very dense atomic network, which makes it very hard, or in other words, the hardest crystallized ma-

terial on the planet. The chemical formula of diamond is pure carbon (C) , but detailed investigations show that 95.99% of it is carbon and the rest are chemical impurities, which can affect the color of the diamond. Carbon nano has many applications in nanoscience and nanoelectronics. Carbon is one of the amazing elements of nature, which is found in four different forms of graphite, diamond, coal and other forms of carbon in nature. All these four forms are solid and in their structure, carbon atoms are completely and regularly placed next to each other. Carbon is one of the most important elements in nature, and its many uses in human life confirm this point well. For example, steel - which is one of the main engineering alloys - is obtained from the dissolution of about two percent of carbon in iron; By changing the percentage of carbon by only a few hundred percent, all kinds of steel can be obtained. "Organic chemistry" is also a science that investigates compounds containing "carbon" and "hydrogen" and polymer engineering is based only on the carbon element. Carbon is found in four different forms in nature , all of these four forms are solid, and in their structure, carbon atoms are placed next to each other in a completely regular manner.

Figure 2: **Diamond nanoparticles**

Διαμονδ νανοπαρτιςλες αρε ονε οφ τηε μοστ αδανςεδ ςαρβον ματεριαλς ιν τηε ωορλδ. Διαμονδ ις κνοων φορ ιτς εξτραορδιναρψ πηψσιςαλ προπερτιες, συςη ας τηε ηιγηεστ ηαρδνεσς ον εαρτη, συπεριορ τηερμαλ ςονδυςτιιτψ ςομπαρεδ το ανψ βυλκ ματεριαλ, ηιγη ρεφραστιε ινδεξ, ανδ ηιγη ρεφραστιε ινδεξ. Διαμονδ νανοπαρτιςλες αρε νοτ ονλψ σμαλλ-σιζεδ διαμονδς ωιτη τηε αβοε ςηαραστεριστιςς, βυτ δυε το τηειρ νανο σιζε, διφφερεντ φυνςτιοναλ γρουπς, ηιγη δισπερσιον, ζ ποτεντιαλ, ανδ αμορπηους ςαρβον, τηεψ ςαν αλσο ςρεατε οτηερ φυνςτιονς. Τηε στρυςτυρε οφ διαμονδ νανοπαρτιςλες ςονσιστς οφ α διαμονδ ςορε ανδ αμορπηους ςαρβον λαψερς. Ιν μορε ςομπλεξ ςονδιτιονς, εαςη παρτιςλε οφ νανοδιαμονδ ις ΣΠ 3 βονδινγ οφ ςαρβον ατομς ςοερεδ βψ ΣΠ 2 . Τηε μοστ υνιχυε φεατυρε οφ νανοδιαμονδ ις τηε πρεσενςε οφ αριους οξψγενατεδ φυνςτιοναλ γρουπς ον τηε συρφαςε, σο διαμονδ νανοπαρτιςλες ηαε α ηιγη ποτεντιαλ ιν ωατερ. Τηε ηιγη ποτεντιαλ δισπερσες διαμονδ νανοπαρτιςλες υνιφορμλψ ανδ σταβλψ ιν ωατερ. Δαισελ αλσο αςηιεεδ τηε δισπερσιον οφ νανοφιελδς ιν διφφερεντ οργανις σολεντς συςη ας ΙΠΑ, ΤΗΦ, ΜΙΒΚ ανδ τολυενε βψ μοδιφψινγ συρφαςε ςηεμιςαλς ον νανοσανδς. Νανο φιελδ ις προδυςεδ βψ εξπλοσιον μετηοδ ανδ τηε σψντηεσιζεδ διαμονδ ις ερψ σμαλλ παρτιςλες ωιτη αν αεραγε διαμετερ βετωεεν 4 ˜ 6 νμ. Τηεσε παρτιςλες αρε νεαρλψ σπηεριςαλ (εξαςτλψ πολψηεδραλ) υνλικε διαμονδ αβρασιες φορ λαππινγ, ςρεεπ ανδ πολισηινγ. Αςςορδινγ το τηε σιζε ανδ σηαπε, α σπεςιφις συρφαςε οφ α παρτιςλε οφ νανοδιαμονδς ις μορε τηαν 300Μ 2 / γ.ôμπαρεδ το οτηερ νανο ματεριαλς συςη ας νανο σιλιςα, γραπηενε, ςαρβον νανοτυβες, φυλλερενες ανδ ςαρβον νανοηορνς, διαμονδ νανοπαρτιςλες ςαν βε υσεδ ιν υνιχυε αππλιςατιονς. Ποσσιβλε αππλιςατιονς οφ νανομιδς αρε λυβριςαντ δισιντεγρατινγ αδδιτιες, αντιοξιδαντς, γραιν ρεφινινγ αγεντ, βιοιμαγινγ, δρυγ δελιερψ, διαμονδ σενσορς, ανδ οτηερς. Εαςη περφορμανςε οφ διαμονδ νανοπαρτιςλες ιν αππλιςατιονς ις ρεμαρκαβλψ υνιχυε. Διαμονδ νανοπαρτιςλες ςαν βε αν εξςελλεντ τρανσφορματιε νανοματεριαλ ωιτη μανψ ποτεντιαλ προδυςτς ανδ αππλιςατιονς.

Conclusion :

in nanoelectronic industries; Nano chip, increasing the speed of nano transistors, both types of diamonds, i.e. n and p type stones, are used for nanoelectronic applications in microelectronics. By adding "B" metal impurity to diamond, P type

nano diamond can be made. That is, he produced blue diamonds and by adding phosphorus to colorless diamonds, he also produced n-type diamonds.

(Rashid, 2024)

(Choe, 2024)

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