

Silver Has the Highest Electrical Conductivity of Particles in Nanoelectronics

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- **Abstract:**

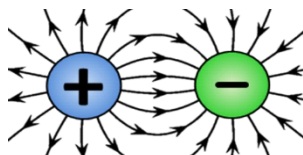
- Electrical nanoparticles are of great interest both in industry and in natural sciences due to their wide application. While natural materials have constant physical properties regardless of size

- **Keywords:** Electrical Nanoparticles , Nanoelectronic , Nano Silver , Nanoparticles

Introduction •

The size of an electrical nanoparticle determines its physical and chemical properties. Therefore, the properties of a material change as its size approaches the nanoscale and the percentage of atoms on the surface of the material becomes significant. An important feature of all nanostructures is that the number of surface atoms in them is greater than the number of bulk atoms. This ratio increases with decreasing nanoparticle size. Therefore, the size of the nanoparticle is considered its important feature. The range of change in the activity of nanoparticles depends on the nature and shape of the nanostructure. However, if the energy of the nanoparticle field is comparable to the energy of electromagnetic radiation and if significant changes occur in the irradiated material within a certain wavelength range due to the occurrence of chemical reactions, the activity of nanoparticles up to 100 nm will be significant. The atoms on the surface of the nanoparticles are not compensated in terms of energy. In general, the results of the growth of the energy of the nanoparticle can be expressed as the total energy of the atoms on the surface of the particle. The freedom of movement of the atoms

on the surface of nanostructures is limited, and only vibrational movements and electron motion are possible. These two electrokinetic reactions are interdependent because the displacement of the electron clouds of the atoms necessarily changes the vibrational frequencies of the bonds of the atoms of the nanoparticles. On the other hand, the displacement of the valence electrons in the bonds changes the polarity of the bond and the objects called the supermolecule. In this case, the transfer of the electron to a higher energy level becomes possible.



Silver has the highest electrical conductivity of all metals, but since it is very expensive, it is not widely used for electrical purposes. Silver is not a chemically active metal; however, sulfuric acid and concentrated sulfuric acid react with it. Silver can be obtained from pure deposits as well as from silver ores. Silver does not oxidize in air. However, it reacts with hydrogen sulfide in the air, causing tarnishing of the metal due to the formation of silver sulfide. Hence, silver products require regular cleaning. Silver is stable in water. Pure silver is almost white, shiny, soft, malleable, and an excellent conductor of heat and electricity. Silver is so soft that it cannot be used in its pure form but must be combined with other metals.



The use of particles from microscale to nanoscale provides advantages for various scientific fields, but because a large percentage of their atoms are on the surface, nanomaterials can react greatly and pose potential risks to humans.

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