

One-dimensional nanostructures, the possibility of improving the electrical-optical properties of nano-electronic par

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Note: Examining the band gap structure of nanoelectronic devices, in addition to introducing a method for researching the performance of one-dimensional systems, has made it possible to improve the electrical-optical properties of electronic components.

Devices based on organic materials can be mechanically flexible to a large extent because of the loose intermolecular bonds in the nano-electrons created from them. Unlike these organic materials, minerals such as silicon, germanium, and gallium arsenide can be used in the structure of electronic devices only in crystalline states, and in this case, covalent bonds make flexibility impossible in them. Makes. Properties such as strength, flexibility, electrical conductivity, magnetic properties, color, reactivity, etc. Starting to change the properties of the material by shrinking it depends more than anything on the type of material and the desired property. For example, by reducing the dimensions of a material, generally some mechanical properties of the material such as strength are improved. This increase in strength does not happen only in the range of a few nanometers, and the strength of materials of several tens and even hundreds of nanometers may be much higher than the large-scale mass material. On the other hand, the change of some properties such as color and magnetic properties may occur in dimensions of only a few nanometers.

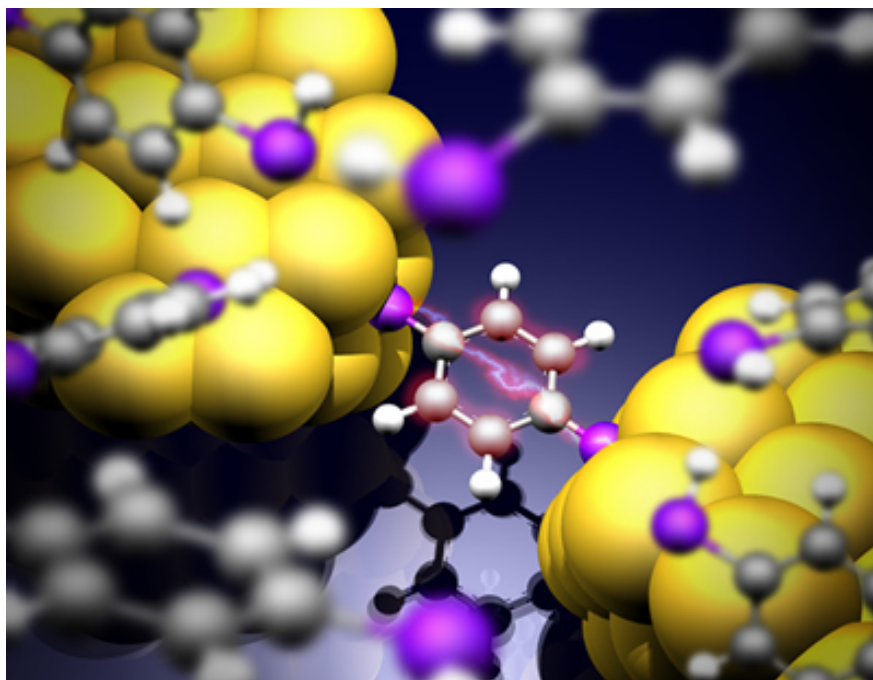


Figure 1: electrical-optical properties of nano-electronic par

In addition to these two items, the state of the energy levels of the electrons around each atom as well as the number of electrons in the last layer also determines the properties of that atom or the substance is effective. This feature can play a decisive role in the mechanism of combining chemical properties of that substance. For example, the properties of a metal ion are different from that of an atom of that metal. Until now, the role of three factors, atomic number, mass number and electronic arrangement of the material is effective in determining the properties of the electrons of the nanostructure of the material. Macroscopic properties of a material such as melting point, boiling point and electrical conductivity, through the study of a sample that is sufficient to measure under normal conditions of nanoparticles Accepts. This is not true for all materials, when the size of the material is reduced and reaches nanometer dimensions, it is possible that the behavior and properties are completely different from the same material in Large dimensions can be seen. If we make a material with the band gap structure of nanoelectronic devices and with a scale of several tens of meters smaller and bring it to millimeter dimensions, there will be no change in the melting point, color and magnetic properties. It is not created, but this change can be seen when reducing the material to nanometer dimensions, and the number of surface atoms in materials with scales larger than nanometers is very small, but upon entering the nanometer world, the amount of these atoms compared to the total atoms of the material is very high. it increases

Conclusion :

Examining the band gap structure of nanoelectronic devices, in addition to introducing a method for researching the performance of one-dimensional systems, has made it possible to improve the electrical-optical properties of electronic components.

(Brouce, 2023)

(Peng, 2023)

(Ricardo, 2024)

(Parker, 2024)

(Swallow, 2024)

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