

# Review of: "An increase in the surface-to- volume ratio and changes in geometry and electronic structure"

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An increase in the surface-to- volume ratio and changes in geometry and electronic structure have a strong impact on the chemical interactions of matter, and for example, the activity of small particles changes with changes in the number of atoms (and thus the size of the particles). Unlike today's nano-transistors, which behave based on the movement of a mass of electrons in matter, new devices follow the phenomena of quantum mechanics at the nano scale, in which the discrete nature of the electron cannot be ignored. By reducing all the horizontal and vertical dimensions of the transistor, the electric charge density increases in different areas of the nano-transistor, or in other words, the number of electric charges per unit area of the nano-transistor increases.

## *This has two negative consequences :*

First, with the increase in electric charge density, the possibility of electric charge discharge from the insulating areas of the transistor increases, and this causes damage to the transistor and its failure. This event is similar to the discharge of excess electrical charge between the cloud and the ground in the phenomenon of lightning, which causes the ionization of air molecules into negative and positive ions. Secondly, with the increase of the electric charge density, the electrons may leave the range of the radius of one atom and enter the range of the neighboring atom's radius under the influence of repulsive or abduction forces, which have now increased in value. This is called tunneling in quantum physics. Electron tunneling from one atom to the adjacent atom is a phenomenon that happens a lot between electrons in small dimensions. This phenomenon is the basis of the work of some electronic components and some nanoscopes. But in nanotransistor, this phenomenon is not a useful phenomenon, because electron tunneling from one atom to the adjacent atom may continue and cause an electric current. Minimizing transistors and entering dimensions below 100 nanometers in the performance range of nanoelectronics technology, although it has many advantages, but it faces various challenges.

*The design, manufacture, development and use of products whose size is in the range of 1 nm to 100 nm is called nanoelectronics. In fact, we are talking about miniaturization, which allows for more contact, more activity, and an increase in area. Nano is a new scale in technologies and a new approach in all disciplines, and it gives mankind the ability to expand its involvement in the structure of materials and design and manufacture in very small dimensions and in all technologies. that the human being has already achieved, to have an effect. And this process has been taken into consideration in the production of nano transistors.*

## **Conclusion :**

**In the Nano transistor structure , the electronic quantity that is more easily available is the ionization potential, and the ionization potential is greater in the size of the small grains of the nano structure (smaller particles), that is, as the size of the particles increases, their ionization potential decreases.**

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