

Zinc Oxide (Zno) Nanoparticles Structure and Properties

Dr.Afshin Rashid , Assistant Professor

Faculty member Islamic Azad University of Science and Research Branch, Tehran

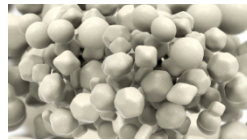
- **Abstract:**

- Zinc is a chemical element represented in the periodic table with atomic number 30. At room temperature, this element is brittle and has a silvery appearance. Zinc has many similarities to magnesium. 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 be highly reactive and pose potential risks to humans.

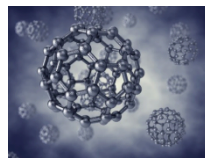
- **Keywords:** Nano structure , Nanoelectronic ,Nano Zinc , Nanoparticles

Introduction •

Nanoparticles are of great interest both in industry and in the natural sciences due to their wide range of applications. While natural materials have constant physical properties regardless of size, the size of a 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 atoms in the volume. This ratio increases with decreasing nanoparticle size. Therefore, the size of the nanoparticle is 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 a certain wavelength range with the occurrence of chemical reactions in the irradiated material, the activity of nanoparticles up to 100 nm will be significant.



The surface atoms of the nanoparticles are not compensated in terms of energy. In general, the results of the energy growth of the nanoparticles 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 the 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 nanoparticles' atoms. On the other hand, the change in the location of the valence electrons in the bonds changes the polarity of the bond and the objects called the supermolecule. In this case, the electron transfer to a higher energy level becomes possible.



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.

References :

Review of: \nanodipole L/d is significantly reduced, it cannot be used". (2024). Qeios. <https://doi.org/10.32388/y5s2db> Review of: \Amplification of Nano Wires Nano Wire by Electron Nano Lithography". (2023). Qeios. <https://doi.org/10.32388/y5s2db>

["https://doi.org/10.32388/l3md1n"://](https://doi.org/10.32388/l3md1n) HYPERLINK
["https://doi.org/10.32388/l3md1n"](https://doi.org/10.32388/l3md1n) HYPERLINK
["https://doi.org/10.32388/l3md1n"](https://doi.org/10.32388/l3md1n) HYPERLINK
["https://doi.org/10.32388/l3md1n" doi.](https://doi.org/10.32388/l3md1n) HYPERLINK
["https://doi.org/10.32388/l3md1n"](https://doi.org/10.32388/l3md1n) HYPERLINK
["https://doi.org/10.32388/l3md1n"](https://doi.org/10.32388/l3md1n) HYPERLINK
["https://doi.org/10.32388/l3md1n" org/](https://doi.org/10.32388/l3md1n) HYPERLINK
["https://doi.org/10.32388/l3md1n"](https://doi.org/10.32388/l3md1n) HYPERLINK
["https://doi.org/10.32388/l3md1n"](https://doi.org/10.32388/l3md1n) HYPERLINK
["https://doi.org/10.32388/l3md1n" 10.32388](https://doi.org/10.32388/l3md1n) HYPERLINK
["https://doi.org/10.32388/l3md1n"](https://doi.org/10.32388/l3md1n) HYPERLINK
["https://doi.org/10.32388/l3md1n"](https://doi.org/10.32388/l3md1n) HYPERLINK
["https://doi.org/10.32388/l3md1n"/](https://doi.org/10.32388/l3md1n) HYPERLINK
["https://doi.org/10.32388/l3md1n"](https://doi.org/10.32388/l3md1n) HYPERLINK
["https://doi.org/10.32388/l3md1n"](https://doi.org/10.32388/l3md1n) HYPERLINK
["https://doi.org/10.32388/l3md1n"l](https://doi.org/10.32388/l3md1n) HYPERLINK
["https://doi.org/10.32388/l3md1n"](https://doi.org/10.32388/l3md1n) HYPERLINK
["https://doi.org/10.32388/l3md1n"](https://doi.org/10.32388/l3md1n) HYPERLINK
["https://doi.org/10.32388/l3md1n"3](https://doi.org/10.32388/l3md1n) HYPERLINK
["https://doi.org/10.32388/l3md1n"](https://doi.org/10.32388/l3md1n) HYPERLINK
["https://doi.org/10.32388/l3md1n"](https://doi.org/10.32388/l3md1n) HYPERLINK
["https://doi.org/10.32388/l3md1n"md](https://doi.org/10.32388/l3md1n) HYPERLINK
["https://doi.org/10.32388/l3md1n"](https://doi.org/10.32388/l3md1n) HYPERLINK
["https://doi.org/10.32388/l3md1n"](https://doi.org/10.32388/l3md1n) HYPERLINK
["https://doi.org/10.32388/l3md1n"1](https://doi.org/10.32388/l3md1n) HYPERLINK
["https://doi.org/10.32388/l3md1n"](https://doi.org/10.32388/l3md1n) HYPERLINK HYPERLINK
["https://doi.org/10.32388/l3md1n" "https://doi.org/10.32388/l3md1n"](https://doi.org/10.32388/l3md1n) HYPERLINK
["https://doi.org/10.32388/l3md1n"n](https://doi.org/10.32388/l3md1n)

Review of: \The concept of (Nano assembler)". (2023). Qeios. [https](https://doi.org/10.32388/xrrt0e) HYPERLINK
["https://doi.org/10.32388/xrrt0e"://](https://doi.org/10.32388/xrrt0e) HYPERLINK ["https://doi.org/10.32388/xrrt0e"](https://doi.org/10.32388/xrrt0e)
HYPERLINK ["https://doi.org/10.32388/xrrt0e"](https://doi.org/10.32388/xrrt0e) HYPERLINK
["https://doi.org/10.32388/xrrt0e" doi.](https://doi.org/10.32388/xrrt0e) HYPERLINK
["https://doi.org/10.32388/xrrt0e"](https://doi.org/10.32388/xrrt0e) HYPERLINK ["https://doi.org/10.32388/xrrt0e"](https://doi.org/10.32388/xrrt0e)
HYPERLINK ["https://doi.org/10.32388/xrrt0e" org/](https://doi.org/10.32388/xrrt0e) HYPERLINK
["https://doi.org/10.32388/xrrt0e"](https://doi.org/10.32388/xrrt0e) HYPERLINK ["https://doi.org/10.32388/xrrt0e"](https://doi.org/10.32388/xrrt0e)
HYPERLINK ["https://doi.org/10.32388/xrrt0e" 10.32388](https://doi.org/10.32388/xrrt0e) HYPERLINK
["https://doi.org/10.32388/xrrt0e"](https://doi.org/10.32388/xrrt0e) HYPERLINK ["https://doi.org/10.32388/xrrt0e"](https://doi.org/10.32388/xrrt0e)
HYPERLINK ["https://doi.org/10.32388/xrrt0e"/](https://doi.org/10.32388/xrrt0e) HYPERLINK
["https://doi.org/10.32388/xrrt0e"](https://doi.org/10.32388/xrrt0e) HYPERLINK ["https://doi.org/10.32388/xrrt0e"](https://doi.org/10.32388/xrrt0e)
HYPERLINK ["https://doi.org/10.32388/xrrt0e"xrrt](https://doi.org/10.32388/xrrt0e) HYPERLINK
["https://doi.org/10.32388/xrrt0e"](https://doi.org/10.32388/xrrt0e) HYPERLINK ["https://doi.org/10.32388/xrrt0e"](https://doi.org/10.32388/xrrt0e)
HYPERLINK ["https://doi.org/10.32388/xrrt0e"0](https://doi.org/10.32388/xrrt0e) HYPERLINK

["https://doi.org/10.32388/xrrt0e"](https://doi.org/10.32388/xrrt0e) HYPERLINK
["https://doi.org/10.32388/xrrt0e"](https://doi.org/10.32388/xrrt0e) HYPERLINK ["https://doi.org/10.32388/xrrt0e"](https://doi.org/10.32388/xrrt0e)
HYPERLINK ["https://doi.org/10.32388/xrrt0e"](https://doi.org/10.32388/xrrt0e)e

Review of: \The degree of order and dimensions of nanowires produced using templates". (2023). Qeios. [https](https://doi.org/10.32388/7siu3m) HYPERLINK ["https://doi.org/10.32388/7siu3m"](https://doi.org/10.32388/7siu3m)://
HYPERLINK ["https://doi.org/10.32388/7siu3m"](https://doi.org/10.32388/7siu3m) HYPERLINK
["https://doi.org/10.32388/7siu3m"](https://doi.org/10.32388/7siu3m) HYPERLINK
["https://doi.org/10.32388/7siu3m"](https://doi.org/10.32388/7siu3m)doi. HYPERLINK
["https://doi.org/10.32388/7siu3m"](https://doi.org/10.32388/7siu3m) HYPERLINK ["https://doi.org/10.32388/7siu3m"](https://doi.org/10.32388/7siu3m)
HYPERLINK ["https://doi.org/10.32388/7siu3m"](https://doi.org/10.32388/7siu3m)org/ HYPERLINK
["https://doi.org/10.32388/7siu3m"](https://doi.org/10.32388/7siu3m) HYPERLINK ["https://doi.org/10.32388/7siu3m"](https://doi.org/10.32388/7siu3m)
HYPERLINK ["https://doi.org/10.32388/7siu3m"](https://doi.org/10.32388/7siu3m)10.32388 HYPERLINK
["https://doi.org/10.32388/7siu3m"](https://doi.org/10.32388/7siu3m) HYPERLINK ["https://doi.org/10.32388/7siu3m"](https://doi.org/10.32388/7siu3m)
HYPERLINK ["https://doi.org/10.32388/7siu3m"](https://doi.org/10.32388/7siu3m)/ HYPERLINK
["https://doi.org/10.32388/7siu3m"](https://doi.org/10.32388/7siu3m) HYPERLINK ["https://doi.org/10.32388/7siu3m"](https://doi.org/10.32388/7siu3m)
HYPERLINK ["https://doi.org/10.32388/7siu3m"](https://doi.org/10.32388/7siu3m)7 HYPERLINK
["https://doi.org/10.32388/7siu3m"](https://doi.org/10.32388/7siu3m) HYPERLINK ["https://doi.org/10.32388/7siu3m"](https://doi.org/10.32388/7siu3m)
HYPERLINK ["https://doi.org/10.32388/7siu3m"](https://doi.org/10.32388/7siu3m)siu HYPERLINK
["https://doi.org/10.32388/7siu3m"](https://doi.org/10.32388/7siu3m) HYPERLINK ["https://doi.org/10.32388/7siu3m"](https://doi.org/10.32388/7siu3m)
HYPERLINK ["https://doi.org/10.32388/7siu3m"](https://doi.org/10.32388/7siu3m)3 HYPERLINK
["https://doi.org/10.32388/7siu3m"](https://doi.org/10.32388/7siu3m) HYPERLINK
["https://doi.org/10.32388/7siu3m"](https://doi.org/10.32388/7siu3m)HYPERLINK ["https://doi.org/10.32388/7siu3m"](https://doi.org/10.32388/7siu3m)
HYPERLINK ["https://doi.org/10.32388/7siu3m"](https://doi.org/10.32388/7siu3m)m

Review of: \It has been done in the manufacture of nanowires through regular one-dimensional arrays with the help of dierent physical and chemical methods". (2023). Qeios. [https](https://doi.org/10.32388/pg9m4tReview) HYPERLINK ["https://doi.org/10.32388/pg9m4tReview"](https://doi.org/10.32388/pg9m4tReview)://
HYPERLINK ["https://doi.org/10.32388/pg9m4tReview"](https://doi.org/10.32388/pg9m4tReview) HYPERLINK
["https://doi.org/10.32388/pg9m4tReview"](https://doi.org/10.32388/pg9m4tReview) HYPERLINK
["https://doi.org/10.32388/pg9m4tReview"](https://doi.org/10.32388/pg9m4tReview)doi. HYPERLINK
["https://doi.org/10.32388/pg9m4tReview"](https://doi.org/10.32388/pg9m4tReview) HYPERLINK
["https://doi.org/10.32388/pg9m4tReview"](https://doi.org/10.32388/pg9m4tReview) HYPERLINK
["https://doi.org/10.32388/pg9m4tReview"](https://doi.org/10.32388/pg9m4tReview)org/ HYPERLINK
["https://doi.org/10.32388/pg9m4tReview"](https://doi.org/10.32388/pg9m4tReview) HYPERLINK
["https://doi.org/10.32388/pg9m4tReview"](https://doi.org/10.32388/pg9m4tReview) HYPERLINK
["https://doi.org/10.32388/pg9m4tReview"](https://doi.org/10.32388/pg9m4tReview) HYPERLINK
["https://doi.org/10.32388/pg9m4tReview"](https://doi.org/10.32388/pg9m4tReview)10.32388 HYPERLINK
["https://doi.org/10.32388/pg9m4tReview"](https://doi.org/10.32388/pg9m4tReview) HYPERLINK
["https://doi.org/10.32388/pg9m4tReview"](https://doi.org/10.32388/pg9m4tReview) HYPERLINK
["https://doi.org/10.32388/pg9m4tReview"](https://doi.org/10.32388/pg9m4tReview) HYPERLINK
["https://doi.org/10.32388/pg9m4tReview"](https://doi.org/10.32388/pg9m4tReview)/ HYPERLINK
["https://doi.org/10.32388/pg9m4tReview"](https://doi.org/10.32388/pg9m4tReview) HYPERLINK
["https://doi.org/10.32388/pg9m4tReview"](https://doi.org/10.32388/pg9m4tReview) HYPERLINK

