Chromium (Cr) Nanoparticles : Structure and Function

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- **Abstract:**

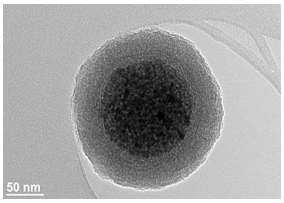
- Chromium or chromium is a hard, shiny, metallic gray metal with high polishability, a high boiling point, and remarkable resistance to rust and tarnishing. Chromium is an element in the periodic table with the symbol Cr and atomic number 24. The use of particles from the microscale to the nanoscale 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 hazards to humans.

- **Keywords:** Nano Chromium , energy intensity , industrial nano metallic , Nano Particle

Introduction •

Chromium is extracted in the form of chromite ore (H2CrO4) . The most common oxidation states of chromium are +2, +3, and +6, with +3 being the most stable, and +4 and +5 being relatively rare. Chromium compounds in the +6 oxidation state are strong oxidizers. Chromium naturally consists of 3 stable isotopes and 19 radioisotopes. This element also has 2 excited states. Nanoparticles are of great interest both in industry and in the natural sciences due to their wide application. 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 bulk atoms. This ratio increases with decreasing nanoparticle size. Therefore, the size of the nanoparticle is considered an important feature.The range of change in the activity of

nanoparticles depends on the nature and shape of the nanostructure. However, Now, 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 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 energy growth of a 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 atoms necessarily changes the vibrational frequencies of the bonds of the atoms of the nanoparticle . 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 transfer of the electron to a higher energy level becomes possible.

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