

# An Overview of Magnetic Nanoparticles: Physical and Chemical Traits in Modern Medicine

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**Abstract:** Medical applications have shown the immense potential of magnetic nanoparticles (MNPs). Technological developments in the synthesis and manipulation of nanoscale materials have accelerated the creation of many MNP medicinal applications. This study examines the primary physical and chemical characteristics of MNPs that are significant for medicinal applications. MNP pharmacokinetics and cellular adsorption are closely linked to their physicochemical properties. Superparamagnetic, high magnetic susceptibility, high coercivity, non-toxicity, biocompatibility, and low Curie temperature are some of the essential qualities of MNPs that make them suitable for a wide range of medical applications. Medical uses of magnetic nanoparticles (MNPs) may be broken down into three primary categories: targeted medication administration, magnetic hyperthermia, and contrast agent for applications in magnetic resonance imaging. Coercivity, non-toxicity, biocompatibility, high magnetic susceptibility, and morphology, hydrodynamic size, charge, and other surface features are among the most significant chemical and physical properties of MNPs. Other qualities include charges, hydrodynamic size, and high magnetic susceptibility.

**Keywords:** Magnetic nanoparticles have garnered significant biomedical applications chemical composition, magnetic properties, capabilities