High Magnetization Materials

Exchange coupling and quantum confinement produces extremely high magnetization materials that are superior to traditional metal alloys and amorphous composite magnetic materials. Magnetic nanomaterials in a confinement environment show different properties from their bulk counterparts.

Competitive advantage

- Magnetic materials have many applications, including microwave absorption, sensors, NFC for mobile devices, wireless charging, RFID readers, transformers, magnetic recording media and motors for electric cars. Higher magnetisation facilitates smaller and more efficient devices. The magnetic flux density of most current magnetic materials is limited to around 1–1.6 T. This technology uses the quantum confinement effect to greatly increase magnetisation.
- By embedding nanostructured magnetic materials into a magnetic reservoir, high magnetisation materials can be achieved, with a magnetic moment of over 10 μB/atom at room temperature, compared to 2.2 μB/Fe.

Impact

- Smaller and more efficient magnetic devices

Successful applications

- Development of high sensitivity magnetic sensors
- Investigation of magnetic materials for MEMS applications, Sony
- Development of magnetic nanoparticles as agents for hyperthermia and magnetic resonance imaging
- Development of high sensitivity gas sensors

More Information

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