

Effect of 1D ordering on magnetic properties of iron nanoparticles coated by silica shell

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In our work, we have studied the properties of iron nanoparticles (NPs) coated by silica layer, which were prepared by surface capping agents. Such designed silica layer prevents the oxidation of the iron cores and promotes the self-organization of NPs into the 1D chain structures. Magnetization study shows that prepared nanoparticles exhibit strong inter-particle magnetic interactions, which lead to long-range ordering of NPs magnetic moments. Magnetic properties show superferromagnetic behaviour. The low value of room temperature coercivity, the existence of electrical insulating silica layer and small size of Fe NPs favour studied material for potential usage in microelectronic devices designed for high voltage frequencies.

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