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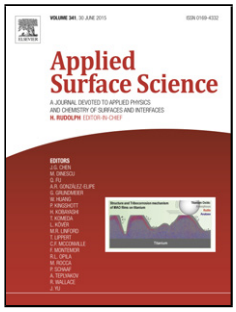

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Hierarchical Nickel Nanowire synthesis using Polysorbate 80 as capping agent

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Highlights

1. Nickel nanoparticles were synthesized using simple hydrazine hydrate reduction method without the addition of NaOH in the presence of tween 80 capping agent.
2. Nickel nanowires exhibited hierarchical structure with an excellent phase purity and without any traces of oxides.
3. Nickel nanowires showed a good saturation magnetization of 43.5emu/g and a low coercivity og 99G making them a soft ferromagnetic material.
4. Excellent bactericidal property was realized for nickel nanowires when compared to spherical nickel nanoparticles.

Abstract

Nanomaterials find applications in multiple fields including food and beverages, waste water management, electrical and electronics due to their interesting properties. These properties can be fine-tuned using various synthesis techniques ranging from solid state route to different wet chemical techniques like precipitation, sol-gel, hydrothermal and solvothermal methods. Here, we report a simple wet chemical synthesis of nickel nanoparticles using Tween 80 as the capping agent. Scanning electron microscopy (SEM) revealed a hierarchical nanowire- like morphology with thorn like sharp edges while the presence of nickel in the sample was confirmed by energy dispersive spectroscopy (EDS). X-ray diffraction studies ascertained the crystalline nature of nickel nanowires and also the purity of the as-synthesized nanowires. Transmission electron Microscopy (TEM) and Selected Area Electron Diffraction (SAED) analysis of the sample indicated the existence of a small quantity of nickel hydroxide. The magnetic property of the