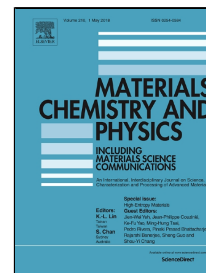


# Accepted Manuscript

Characterization, antibacterial and cytotoxicity studies of graphene-Fe<sub>3</sub>O<sub>4</sub> nanocomposites and Fe<sub>3</sub>O<sub>4</sub> nanoparticles synthesized by a facile solvothermal method



A. Nayamadi Mahmoodabadi, A. Kompany, M. Mashreghi

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## Characterization, antibacterial and cytotoxicity studies of graphene-Fe<sub>3</sub>O<sub>4</sub> nanocomposites and Fe<sub>3</sub>O<sub>4</sub> nanoparticles synthesized by a facile solvothermal method

A. Nayamadi Mahmoodabadi <sup>a</sup>, A. Kompany<sup>a,b,\*</sup>, M. Mashreghi<sup>b,c</sup>

<sup>a</sup>Materials and Electroceramics Lab, Department of Physics, Ferdowsi University of Mashhad, Mashhad, Iran

<sup>b</sup>Nano Research Center, Ferdowsi University of Mashhad, Mashhad, 9177948974, Iran

<sup>c</sup>Department of Biology, Ferdowsi University of Mashhad, Mashhad, 9177948974, Iran

\*Corresponding Author: [kompany@um.ac.ir](mailto:kompany@um.ac.ir)

Tel: +989153131366

### Abstract

Graphene-Fe<sub>3</sub>O<sub>4</sub> (G-Fe<sub>3</sub>O<sub>4</sub>) nanocomposites with different GO/Fe<sub>3</sub>O<sub>4</sub> weight ratios of 1-1, 1-3 and 1-5 were synthesized using solvothermal method. Also, Fe<sub>3</sub>O<sub>4</sub> nanoparticles (NPs) were separately synthesized by the same method. The prepared samples were characterized by X-ray diffraction (XRD), transmission electron microscopy (TEM) and Fourier transform infrared (FTIR) spectroscopy. Zeta potential analysis and scanning electron microscopy (SEM) were employed to measure the surface charge and the destruction processes of the bacteria. The XRD analysis showed that the graphene oxide had been reduced and also confirmed the formation of G-Fe<sub>3</sub>O<sub>4</sub> nanocomposites. The antibacterial properties of the prepared samples were investigated against *Escherichia coli* (ATCC 25922) and *Staphylococcus aureus* (ATCC 25923) strains, using three different methods. Our results revealed that the G-Fe<sub>3</sub>O<sub>4</sub> with 1-5 weight ratio has higher antibacterial activity and lower toxicity, compared to the other two nanocomposite samples, GO and also Fe<sub>3</sub>O<sub>4</sub> NPs.

Keywords: Solvothermal, Fe<sub>3</sub>O<sub>4</sub> nanoparticles; G-Fe<sub>3</sub>O<sub>4</sub> nanocomposites; antibacterial property, cytotoxicity.

### 1. Introduction

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