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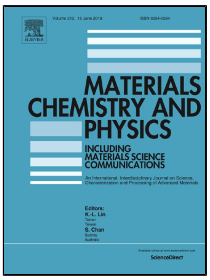

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Polyrhodanine cobalt ferrite (PRHD@$CoFe_2O_4$) hybrid nanomaterials - synthesis, structural, magnetic, cytotoxic and antibacterial properties

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Abstract

Polymeric hybrid materials were synthesized via chemical oxidation polymerization. Process was carried on the surface of the magnetic nanoparticles, (prepared separately) where the initiator (Fe^{3+} ions) was located. The structure of the resulting nanocomposite was investigated in detail by means of X-ray diffraction (XRD) and Fourier-transform infrared spectroscopy (FTIR).The hydrodynamic size and morphology were evaluated by scanning electron microscopy (SEM) and dynamic light scattering (DLS). The polymeric shell was controlled, and investigated using TGA analysis together with TEM characterization. Magnetic properties of the PRHD@$CoFe_2O_4$ hybrid nanomaterials were studied in a wide range of temperature and in fields up to 120 kOe. The magnetic properties were investigated to determine to what extent the PRHD shell separates magnetically the $CoFe_2O_4$ nanoparticles and influences their properties.. The cytotoxicity of the nanoparticles was tested against mouse macrophage (J774.E) and human osteosarcoma cell line (U2OS). Additionally, sensitivity of bacteria *Escherichia coli* ATCC 8739 and *Staphylococcus aureus* ATCC 25923 to hybrid materials was investigated using a of Kirby-Bauer disc method.

Keywords: polyrhodanine, oxidative polymerization, hybrid materials, ferrite, magnetic properties, cytotoxicity, antimicrobial activity