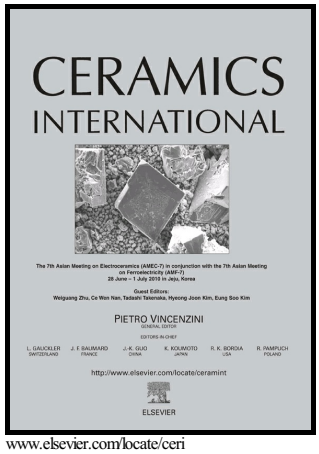

www.elsevier.com/locate/ceri

Green facile synthesis of low-toxic superparamagnetic iron oxide nanoparticles (SPIONs) and their cytotoxicity effects toward Neuro2A and HUVEC cell lines

Leila Gholami, Reza Kazemi Oskuee, Mohsen Tafaghodi, Abouzar Ramezani Farkhani, Majid Darroudi

PII: S0272-8842(18)30447-4
DOI: https://doi.org/10.1016/j.ceramint.2018.02.137
Reference: CERI17539

To appear in: *Ceramics International*

Received date: 31 December 2017
Revised date: 9 February 2018
Accepted date: 15 February 2018

Cite this article as: Leila Gholami, Reza Kazemi Oskuee, Mohsen Tafaghodi, Abouzar Ramezani Farkhani and Majid Darroudi, Green facile synthesis of low-toxic superparamagnetic iron oxide nanoparticles (SPIONs) and their cytotoxicity effects toward Neuro2A and HUVEC cell lines, *Ceramics International,* https://doi.org/10.1016/j.ceramint.2018.02.137

Green facile synthesis of low-toxic superparamagnetic iron oxide nanoparticles (SPIONs) and their cytotoxicity effects toward Neuro2A and HUVEC cell lines

Leila Gholami[a], Reza Kazemi Oskuee[b], Mohsen Tafaghodi[c], Abouzar Ramezani Farkhani[c], Majid Darroudi[d,e,*]

[a]Neurogenic Inflammation Research Center, Mashhad University of Medical Sciences, Mashhad 9177948564, Iran
[b]Targeted Drug Delivery Research Center, Mashhad University of Medical Sciences, Mashhad, Iran
[c]Nanotechnology Research Center, Pharmaceutical Technology Institute, Mashhad University of Medical Sciences, Mashhad, Iran
[d]Nuclear Medicine Research Center, Mashhad University of Medical Sciences, Mashhad, Iran
[e]Department of Modern Sciences and Technologies, Mashhad University of Medical Sciences, Mashhad, Iran

Abstract

Superparamagnetic iron oxide (Fe_3O_4) nanoparticles (SPIONs) were synthesized by co-precipitation using polyvinyl alcohol (PVA) as a capping agent under alkaline condition. The produced X-ray diffraction (XRD) pattern evidenced the presence of peaks corresponding to the inverse spinel structure of the prepared SPIONs. Debye-Scherrer and field emission scanning microscopy (FESEM) showed the prepared SPIONs to be well-defined with about < 50 nm size. Likewise, the superparamagnetic properties of the SPIONs measured by Vibrating Sample Magnetometer (VSM) showed high saturation magnetization (~ 65.36 emu/g). The *in vitro* cytotoxicity studies on Neuro2A and HUVEC cells have mentioned low toxic and non-toxic SPIONs, respectively in a range of concentrations (1.17-150 μg/ml), thus, we reckon that the synthesized SPIONs will have persistent utilization in different fields of medical applications.

Keywords:

Iron oxide nanoparticles, superparamagnetic, co-precipitation, cytotoxicity, XRD

[*]***Corresponding author:***

M. Darroudi (E-mail: darroudim@mums.ac.ir & Tel.: +98-513-8002286 & Fax: +98-513-8002287)