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Mahnaz Enayati, Ali Nemati, Ali Zarrabi, Mohammad Ali Shokrgozar

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## Reduced Graphene Oxide: An Alternative for Magnetic Resonance Imaging Contrast Agent

Mahnaz Enayati<sup>1</sup>, Ali Nemati<sup>2\*</sup>, Ali Zarrabi<sup>3</sup>, Mohammad Ali Shokrgozar<sup>4</sup>

<sup>1</sup> *Materials Engineering Department, Science and Research Branch, IAU, Tehran, Iran*

<sup>2</sup> *Materials Science & Engineering Department, Sharif University of Technology, Tehran, Iran*

<sup>3</sup> *Department of Biotechnology, Faculty of Advanced Sciences & Technologies, University of Isfahan, Isfahan, Iran*

<sup>4</sup> *National Cell Bank of Iran, Pasteur Institute of Iran, Tehran, Iran*

### Abstract:

Graphene oxide (GO) has never been considered as a **Magnetic Resonance imaging (MRI)** contrast agent since it was conceived as a diamagnetic material. There is a possibility that introduction of structural defects or manipulation of oxygen functionalities in GO change its magnetic response and provided a chance for GO to be a contrast agent for MRI. For this purpose, reduced graphene oxide (RGO) was treated by irradiation and annealing procedures. The study on the magnetic properties of the samples confirmed that the competition between the structural defects and oxygen functionalities to magnetic moments determines the magnetism in RGO.

**Keywords:** MRI; Magnetic properties; Reduced graphene oxide; defects, Oxygen functionalities

### Introduction:

The similarity between proton density and relaxation times of pathologic and non-pathologic tissues during MRI decreases the alternation in their signals. As a result, MRI contrast is too limited to enable specific diagnosis[1,2]. This shortcoming, however overcomes by magnetic compounds named MRI contrast agents (MRICA). Such compounds change the magnetic properties in certain tissue to enhance the differences in signal intensity between the targeted tissue and the adjacent ones improving the imaging contrast[1]. However, the usage of these compounds as a MRICA faces with serious limitations due to possibility of the release of toxic

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