Accepted Manuscript

Magnetoelastic Sensor for Magnetic Nanoparticle Detection

S. Atalay, V.S. Kolat, F.E. Atalay, N. Bayri, H. Kaya, T. Izgi

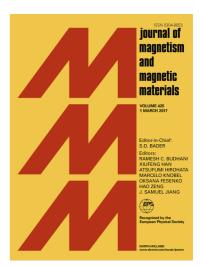
PII: S0304-8853(18)30814-X

DOI: https://doi.org/10.1016/j.jmmm.2018.05.108

Reference: MAGMA 64020

To appear in: Journal of Magnetism and Magnetic Materials

Received Date: 19 March 2018 Revised Date: 30 May 2018 Accepted Date: 30 May 2018



Please cite this article as: S. Atalay, V.S. Kolat, F.E. Atalay, N. Bayri, H. Kaya, T. Izgi, Magnetoelastic Sensor for Magnetic Nanoparticle Detection, *Journal of Magnetism and Magnetic Materials* (2018), doi: https://doi.org/10.1016/j.jmmm.2018.05.108

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

CCEPTED MANUSCRIPT

Magnetoelastic Sensor for Magnetic Nanoparticle Detection

S. Atalay*, V.S. Kolat, F.E. Atalay, N. Bayri, H. Kaya, and T. Izgi

Inonu University, Science Faculty, Department of Physics, Malatya, TURKEY

Abstract

In this study, a magnetoelastic sensor (ME) without any coating was used to detect Fe₃O₄

magnetic nanoparticles (MNPs) for the first time in the literature. An amorphous 2605S3A

(Fe₇₇Cr₂Si₅B₁₆) ribbon was used as an ME sensor, and samples were annealed in a furnace at

360°C for 20 minutes to improve the ME response. A frequency shift of about 320 Hz was

observed at 440 A/m magnetic field with the drop of 20 µl MNPs on the surface of an

amorphous ribbon. MNPs of 10, 5, and 1 µl were dripped onto the surface of the ribbon and

frequency shifts of about 220, 100, and 15 Hz, respectively, were obtained. The minimum

number of MNPs was measured to be about 1.1×10⁹, which corresponds to 0.025 mg or 1 µl

of MNPs.

Keywords: Magnetic nanoparticles, magnetoelastic sensor, amorphous ribbon

*Corresponding Author: Tel: +90 422 3410010; e-mail: selcuk.atalay@inonu.edu.tr

1

Download English Version:

https://daneshyari.com/en/article/8152588

Download Persian Version:

https://daneshyari.com/article/8152588

<u>Daneshyari.com</u>