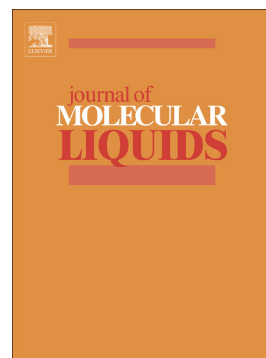


Accepted Manuscript

Optical and structural properties of oxidation resistant colloidal bismuth/gold nanocomposite: An efficient nanoparticles based contrast agent for X-ray computed tomography

S. Dadashi, R. Poursalehi, H. Delavari



PII: S0167-7322(17)34564-6

DOI: <https://doi.org/10.1016/j.molliq.2018.01.069>

Reference: MOLLIQ 8523

To appear in: *Journal of Molecular Liquids*

Received date: 28 September 2017

Revised date: 7 January 2018

Accepted date: 12 January 2018

Please cite this article as: S. Dadashi, R. Poursalehi, H. Delavari , Optical and structural properties of oxidation resistant colloidal bismuth/gold nanocomposite: An efficient nanoparticles based contrast agent for X-ray computed tomography. The address for the corresponding author was captured as affiliation for all authors. Please check if appropriate. Molliq(2017), <https://doi.org/10.1016/j.molliq.2018.01.069>

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.

**Optical and Structural Properties of Oxidation Resistant Colloidal Bismuth/Gold
Nanocomposite: An Efficient Nanoparticles Based Contrast Agent for X-ray Computed
Tomography**

S. Dadashi^a, R. Poursalehi^{a, *}, H. Delavari H.^a

^aNanomaterials group, Department of Materials Engineering, Tarbiat Modares University,
Tehran, Iran

*Corresponding author: poursalehi@modares.ac.ir

Abstract

Optical and biomedical applications of bismuth-based nanostructures could be limited due to the particle oxidation in aqueous media. To overcome this limitation, a two-step process including Nd:YAG pulsed laser ablation of bismuth and chemical reaction for shell formation have been developed to fabricate Bi/Au nanoparticles. The nanoparticles have been extensively characterized by various method including transmission electron microscopy, scanning electron microscopy, energy-dispersive X-ray spectroscopy, X-ray diffraction, optical extinction and MNPBEM simulation package using boundary element method. The prepared bismuth nanoparticles by laser ablation in toluene demonstrate a narrow size distribution with mean size of 40 nm and gold shell were synthesized on Bi core with 7 nm thickness. In optical transmission, the wavelength of maximum absorption peak due to surface plasmon resonance was at 562 nm for gold thickness between 5 to 7 nm. MNPBEM simulation results predict the trends of the experimental observation including the spherical shape and shell thickness. Oxidation resistance of nanoparticles was studied via optical extinction spectroscopy. Oxidation resistance is one of the important factors in efficiency of nanoparticles in aqueous solution as CT contrast agents Finally, Bi/Au composite nanoparticles demonstrated higher x-ray attenuation in comparison with commercial iodine molecule.

Keywords: Bi/Au composite; optical properties; oxidation resistant; CT contrast agent.

Download English Version:

<https://daneshyari.com/en/article/7842853>

Download Persian Version:

<https://daneshyari.com/article/7842853>

[Daneshyari.com](https://daneshyari.com)