

## Accepted Manuscript

Title: Size properties of colloidal nanoparticles produced by nanosecond pulsed laser ablation and studying the effects of liquid medium and laser fluence

Author: Mohammad Hossein Mahdih Behzad Fattahi



PII: S0169-4332(14)02757-3  
DOI: <http://dx.doi.org/doi:10.1016/j.apsusc.2014.12.069>  
Reference: APSUSC 29304

To appear in: *APSUSC*

Received date: 27-9-2014  
Revised date: 6-12-2014  
Accepted date: 9-12-2014

Please cite this article as: M.H. Mahdih, B. Fattahi, Size properties of colloidal nanoparticles produced by nanosecond pulsed laser ablation and studying the effects of liquid medium and laser fluence, *Applied Surface Science* (2014), <http://dx.doi.org/10.1016/j.apsusc.2014.12.069>

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.

# Size properties of colloidal nanoparticles produced by nanosecond pulsed laser ablation and studying the effects of liquid medium and laser fluence

Mohammad Hossein Mahdih<sup>a</sup>, Behzad Fattahi

Department of physics, Iran University of Science and Technology, Narmak, Tehran, Iran, 13114-16846

## Abstract

In this paper pulsed laser ablation method was used for synthesis of colloidal nanoparticles of aluminum and titanium targets in distilled water, ethanol, and acetone as liquid environments. Ultraviolet - Visible (UV-Vis.) absorption spectrophotometer and scanning electron microscope (SEM) were used for characterization of produced nanoparticles. Using image processing technique and analyzing the SEM images, nanoparticles mean size and size distribution were achieved. The results show that liquid medium has strong effect on size properties of produced nanoparticles. From the results it was found that ablation of both metal targets in ethanol medium leads to formation of smaller size nanoparticles with narrower size distributions. The influence of laser fluence was also investigated. According to the results, higher laser fluence produces larger mean size nanoparticles with broader size distribution.

Keywords: laser ablation, colloidal nanoparticles, particle size, liquid type, laser fluence

## 1. Introduction

Nanoparticles play major role in some applications such as biology, medicine, energy conversion and storage, electronics and information storage [1-4]. Nanoparticles have large surface to volume ratio. Such size dependent characteristics provide unique physical and chemical properties for nanoparticles. Metal nanoparticles are an important class of nanomaterials with

---

<sup>a</sup> Corresponding Author: [mahdm@iust.ac.ir](mailto:mahdm@iust.ac.ir)

Download English Version:

<https://daneshyari.com/en/article/5359605>

Download Persian Version:

<https://daneshyari.com/article/5359605>

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