

## Accepted Manuscript

Title: Effect of laser energy on the properties of nanostructured lead iodide film prepared via pulsed laser deposition technique

Authors: Rana K. Abdalnabi, Mayyadah H. Mohsin, Raid A. Ismail, Ali M. Mousa, Muslim F. Jawad



PII: S0030-4026(18)31372-X  
DOI: <https://doi.org/10.1016/j.ijleo.2018.09.069>  
Reference: IJLEO 61508

To appear in:

Received date: 5-6-2018  
Revised date: 15-9-2018  
Accepted date: 16-9-2018

Please cite this article as: Abdalnabi RK, Mohsin MH, Ismail RA, Mousa AM, Jawad MF, Effect of laser energy on the properties of nanostructured lead iodide film prepared via pulsed laser deposition technique, *Optik* (2018), <https://doi.org/10.1016/j.ijleo.2018.09.069>

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.

## Effect of laser energy on the properties of nanostructured lead iodide film prepared via pulsed laser deposition technique

Rana K. Abdulnabi<sup>1</sup>, Mayyadah H. Mohsin<sup>2</sup>, Raid A. Ismail<sup>2</sup>, Ali M. Mousa<sup>2</sup>, Muslim F. Jawad<sup>2</sup>

<sup>1</sup> Middle Technical University, Institute of Technology, Baghdad, Iraq

<sup>2</sup> Department of Applied Science, University of Technology, Baghdad, Iraq

### Abstract

The effect of laser energy density on the optical, structural and electrical properties of lead iodide  $\text{PbI}_2$  film prepared by laser deposition technique was studied. X-ray diffraction XRD results revealed that the  $\text{PbI}_2$  films deposited at laser energy density smaller than  $3.5\text{J}/\text{cm}^2$  are polycrystalline in nature with preferred orientation along (001) plane, while the film deposited at  $3.5\text{J}/\text{cm}^2$  was amorphous. The thickness and deposition rate of the film was found to be increased with laser energy density. The optical energy gap of  $\text{PbI}_2$  film was in the range of (2.5-2.65) eV. SEM investigations showed that the deposited films are dense and have a homogeneous structure and the average grain size increases from 25 to 55nm as laser energy density increases from 2 to  $3.5\text{J}/\text{cm}^2$ . The film surface composed of aggregated grains and particulates. Energy dispersive x-ray illustrated the film deposited at  $2\text{J}/\text{cm}^2$  was stoichiometric and the films deposited at laser energy density  $>2\text{J}/\text{cm}^2$  were off-stoichiometric. The electrical properties revealed that the deposited films were p-type and the electrical resistivity decreases from  $9.2 \times 10^4$  to  $1.49 \times 10^4\ \Omega \cdot \text{cm}$  when laser energy density increases from 2 to  $3\text{J}/\text{cm}^2$ . The hole mobility of the film was found to increase with laser energy

Download English Version:

<https://daneshyari.com/en/article/10226619>

Download Persian Version:

<https://daneshyari.com/article/10226619>

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