

D3

## COMPARISON STUDY OF HYDROTHERMALLY GROWN ZnO NANORODS ON UNTREATED SILICON AND BLACK SILICON SUBSTRATES

Sabah M. Mohammad<sup>1,\*</sup>, Z. Hassan<sup>1</sup>, Suvindraj Rajamanickam<sup>1</sup>, Aminu Muhammad<sup>1,2</sup>

<sup>1</sup>*Institute of Nano Optoelectronics Research and Technology (INOR), Universiti Sains Malaysia (USM), 11800 Penang, MALAYSIA.*

<sup>2</sup>*Department of Physics, Sule Lamido University Kafin-Hausa, Jigawa State, NIGERIA.*

*\*Corresponding Author: sabah@usm.my*

**ABSTRACT-** In this paper, the morphological, structural and optical properties of ZnO nanorods grown using the hydrothermal method was studied on two different substrates: untreated silicon and black silicon. Prior to hydrothermal growth, ZnO seed layer was deposited onto the substrates using radio-frequency (RF) sputtering. FESEM imaging was conducted to study the morphology of ZnO nanostructures grown on the substrates. AFM testing was done to determine the surface roughness of both samples. X-Ray diffraction (XRD) and photoluminescence (PL) spectra are obtained to determine the structural and optical properties of ZnO nanostructures. Diffuse reflectance spectra (DRS) was also obtained to determine the ZnO band gap using the Kubelka-Munk theory.

**Keywords:** Zinc oxide nanorods, Black silicon, Hydrothermal method, Characterization.