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A study on linear and non-linear optical constants of Rhodamine B thin film deposited on FTO glass

By: Yahia, IS (Yahia, I. S.)^[1,2]; Jilani, A (Jilani, Asim)^[3]; Abutalib, MM (Abutalib, M. M.)^[3]; AlFaify, S (AlFaify, S.)^[1]; Shkir, M (Shkir, M.)^[2]; Abdel-wahab, MS (Abdel-wahab, M. Sh.)^[3]; Al-Ghamdi, AA (Al-Ghamdi, Attieh A.)^[3]; El-Naggar, AM (El-Naggar, A. M.)^[4]

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Abstract

The aim of this research was to fabricate/deposit the good quality thin film of Rhodamine B dye on fluorine doped tin oxide glass substrate by the low cost spin coating technique and study their linear and nonlinear optical parameters. The thickness of the thin film was measured about 300 nm with alpha step system. The transmittance of the fabricated thin film was found to be above 75% corresponding to the fluorine doped tin oxide layer. The structural analysis was performed with X-rays diffraction spectroscopy. Atomic force microscope showed the topographic image of deposited thin film. Linear optical constant like absorption coefficient, band gap, and extinction index was calculated. The dielectric constant was calculated to know the optical response of Rhodamine B dye over fluorine doped tin oxide substrate. The nonlinear optical constant like linear optical susceptibility in, nonlinear optical susceptibility $\chi^{(3)}$, nonlinear refractive index $n(2)$ were calculated by spectroscopic method. This method has advantage over the experimental method like Z-Scan for organic dye base semiconductors for future advance optoelectronics applications like dye synthesis solar cell. (C) 2016 Elsevier B.V. All rights reserved.

Keywords

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Author Information

Reprint Address: Jilani, A (reprint author)

+ King Abdulaziz Univ, Fac Sci, Dept Phys, Ctr Nanotechnol, AL Faisaliah Campus,POB 80200, Jeddah 21589, Saudi Arabia.

Addresses:

- + [1] Ain Shams Univ, Fac Educ, Dept Phys, Nanosci & Semicond Labs, Cairo, Egypt
- + [2] King Khalid Univ, Fac Sci, Dept Phys, POB 9004, Abha, Saudi Arabia
- + [3] King Abdulaziz Univ, Fac Sci, Dept Phys, Ctr Nanotechnol, AL Faisaliah Campus,POB 80200, Jeddah 21589, Saudi Arabia
- + [4] King Saud Univ, Coll Sci, Dept Phys & Astron, Exploitat Renewable Energy Applicat Saudi Arabia, POB 2455, Riyadh 11451, Saudi Arabia

E-mail Addresses: asim.jilane@gmail.com

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