



## The Optical Limier Behavior and nonlinear optical properties of Nano composite Embedded in Polymer Films Prepared by PLD Technique

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### Abstract:

The multilayers thin films of (TiO<sub>2</sub>/ZnO/CdS) prepared by using pulsed laser deposition technique (PLD) under vacuum of 10<sup>-5</sup> mbar using pulsed Nd:YAG laser with (1064 nm), which deposited on a glass and silicon wafer substrates Poly Methyl Methacrylate with chemical form (C<sub>5</sub>O<sub>2</sub>H<sub>8</sub>) was dissolved in (8mL) chloroform solvent

,and doped with nanoparticles of (TiO<sub>2</sub>/ZnO/CdS) with (25%) doped of energy (800mJ) with number of pulses (1000), X-ray diffraction measurements for sample showed that has polycrystalline structures, cubic & orthorhombic CdS structure, tetragonal & monoclinic TiO<sub>2</sub> structure, hexagonal ZnO structure, AFM images show contrast in homogeneity of grains' surface of films graded various region, and there is gradient in color, The optical properties of all thin films are investigated from absorption spectrum in the UV-VIS through the range of (300-900) nm. The results show that the best optical absorbance edge is in (527.65 nm), also the optical constants such as: extinction coefficient and refractive index for all prepared thin films are calculated, the purpose of the study was to obtain the nonlinearly refraction and absorption coefficient of (TiO<sub>2</sub>/ZnO/CdS). The results close aperture Z-scan self-focusing effect while the open aperture Z-scan of the sample show a two photon absorption (TPA). Result optical limiting is quite encouraging for possible applications in nonlinear optical devices.

### Biography:

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### Publication of speakers:

1. Alnayli, Raad & Alkazali, Hanan. (2018). Study on the linear & nonlinear optical properties of silver nanoparticles colloids in DDDW obtained by means of laser ablation.
2. Alnayli, Raad & Alkhazaali, Hanan & Alkazali, Hanan. (2019). Properties Studies of Silver Nanoparticles Colloids in Ethanol Prepared by Means Pulses Laser. Journal of Nano Research. 60. 154-161. 10.4028/www.scientific.net/JNanoR.60.154.
3. Alnayli, Raad & Alkazali, Hanan. (2018). Study on the linear & nonlinear optical properties of prepared silver nanoparticles. 10.13140/RG.2.2.27287.88482.
4. Alnayli, Raad & Alkazali, Hanan. (2018). Preparation and Study on the nonlinear optical properties of metals nanoparticles colloidal. 10.13140/RG.2.2.31521.10085.

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