Optik
Available online 18 August 2020, 165398
In Press, Journal Pre-proof

Original research article

Solvents effect on the optical nonlinear properties of the sudan iv

Kh. A. Al-Timimy [a], Qusay M.A. Hassan [b], H.A. Sultan [b], C.A. Emshary [b]

Show more

https://doi.org/10.1016/j.ijleo.2020.165398

Abstract

The optical nonlinear properties of three sudan iv solutions in DMSO, DMF and chloroform solvents are studied under irradiation with low power laser beam work at 473 nm. The diffraction ring patterns and Z-scan experiments were carried out separately to calculate the change in the index of refraction and the nonlinear index of refraction of each solution. The rings number per each pattern, the area of each pattern and the outer most ring diameter in each pattern increased with the increase of input laser beam intensity. Each pattern loses symmetry in the upper part as input intensity increased. The obtained diffraction ring patterns are simulated using Fraunhofer approximation of the Fresnel-Kirchhoff diffraction theory where good theoretical agreements with the experimental findings are obtained. According to both methods it is proved that sudan iv three solutions