

Total absorption and refractive index dependence with laser intensity in SiO₂:Methylene blue thin films

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Laser radiation on materials induces non-linear optical responses. High effect is obtained in solutions and solids that contain organic dyes. If laser light is focused with a lens and the sample is moved around the focal point, transmitted light contains information about the third order optical absorption β and refractive index n_2 . This is the Z-scan technique [1]. In this work, SiO₂:Methylene blue thin amorphous films were prepared by sol-gel on silica substrates. By using CTAB surfactant, mesostructured films were also prepared. Hexagonal mesostructure was confirmed by X Ray diffraction. Z-scan experiments were performed on these films. Not only β and n_2 optical parameters were obtained, but also the total optical absorption and total refractive index. They show a clear dependence with the laser intensity. The results are different between amorphous and mesostructured samples. They are presented and discussed.

[1]. Sheik-Bahae, et al.,