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Acid Fuchsin Dye Based PMMA Film for Holographic Investigations

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Abstract : In view of a possible application in optical data storage devices, diffraction grating efficiency of an organic dye, Acid Fuchsin doped in PMMA matrix was studied under excitation with CW diode pumped Nd: YAG laser at 532 nm. The open aperture Z-scan of dye doped polymer displayed saturable absorption and the closed aperture Z-scan of the samples exhibited negative nonlinearity. The diffraction efficiency of the grating is the ratio of the intensity of the first order diffracted power to the incident read beam power. The dye doped polymer films were found to be good media for recording. It is observed that the formation of gratings strongly depend on the concentration of dye in the polymer film, the intensity ratios of the writing beams and the angle between the writing beams. It has been found that efficient writing can be made at an angle of 20° and when the intensity ratio of the writing beams is unity.

Keywords : diffraction efficiency, nonlinear optical material, saturable absorption, surface-relief-gratings
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