NONLINEAR OPTICAL PROPERTIES STUDY IN FLUORESCEIN WITH DIFFERENT CONCENTRATIONS

Hussain A. Badran,   Hussain F. Hussain,
Basrah University, Education College for pure science Physics Department, Basrah, Iraq

Aqeel L. Mghames
Basrah University Physics Department , Science College, Basrah, Iraq

ABSTRACT

The nonlinear optical properties of the Fluorescein solution were studied using single beam Z-scan technique with a continuous-wave Diode laser radiation at 473 nm. The optical response was characterized by measuring the intensity-dependent refractive index (n_2) of the medium using the Z-scan technique. The sample showed negative and large nonlinear refractive index values of the order of $10^{-7} cm^2/W$ and reverse saturable absorption with high values of the nonlinear absorption coefficient of the order of 10^{-4} cm/W. The results show that the solution of Fluorescein exhibits large nonlinear refractive index and nonlinear absorption coefficient. These results show that the solution of Fluorescein have potential application in nonlinear optics.

KEYWORDS: Fluorescein ; Z-scan; Diode laser; nonlinear refractive index.

INTRODUCTION

The search for optimum nonlinear material is active since forty years, through the combined efforts of physics, material science, and chemistry researchers by carrying out continuous nonlinear experiments on various possible materials and this field is very active in research and a promising tool for future photonics technology. Great effort has been made in order to explain the behavior of light beams propagating through in terraces separating optical media with different nonlinear refractive indexes. Development of high power laser sources has motivated an extensive research in the study of nonlinear optical properties and optical limiting behavior of materials [1]. Organic molecules with high nonlinear optical properties are required for photonic applications including optical switching, data storage and optical information processing [2-4]. The study of linear and nonlinear optical