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Abstract: The effects of deoxyribonucleic acid (biological polymer DNA) on full brightness, and color matching functions of Ethidium bromide dye doped PVP/DNA films were studied. Ethidium bromide dye doped PVP/DNA films were deposited on soda-lime glass substrates by the deep casting method. The variation of CIE chromaticity coordinates for PVP/DNA films with increasing Ethidium bromide dye concentration values are determined. The CIE 1931 color space move to the magenta region. The results indicate that Ethidium bromide dye doped PVP/DNA films have potential promising material for optical device applications and candidates used for LEDs pumped by UV chips and applied in many advanced technologies.

Keywords: deoxyribonucleic acid; CIE 1931 color space; Ethidium bromide; CIE chromaticity; PVP

1. INTRODUCTION

It was essential to find new nonlinear optical materials with a high optics nonlinear coefficient for potential novel opto-electronics applications [1]. Nonlinear refraction [2] and nonlinear absorption [3] are the essential third-order nonlinear optical parameters of Ethidium bromide or Nano-composite films for optoelectronic [4], photonic devices [5], limiter devices [6], all optical switching[7,8] , thermal lens [9-11], dosimetry [12-14], shielding [15,16], nuclear detector[17] and labeling of biological molecules [18]. All this requires searching for materials that exhibit nonlinear properties, such as organic dye[19,20], azo dye [21,22], Schiff-base dye [23], organic compound [24], conducting polymer [25], polymer film [26-28], polymer solution[29], biopolymer [30,31], nanoparticle [32], Nanocompouse [33,34] and liquid crystal [35]. In recent decades, various technologies of optical limiters have been affected by the widely used applications of laser technology [36]. To overcome this worsening of laser blindness, many countries around the world are making efforts to develop new materials with a good optically limiting character. [37,38]. Usually, transparent polymeric materials are preferred over the rest of the traditional optical materials (crystals and glass) because of the possibility of adding to them many impurities such as dyes [39-41], which leads to a change in the properties of the polymer [42]. The polymethylmethacrylate (PMMA) or DNA polymer is one of the most used host polymers due to its high transparency within the visible spectrum and its resistance to optical damage from laser radiation [43-45]. Many researchers have studied the properties of this polymer when