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Preparation and optoelectronic studies of the organic compound [2-(2,3-dimethyl phenylamino)-*N*-Phenyl benzamide doped(PMMA)]

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Abstract

The optical characteristics of organic compound, 2- (2,3-dimethyl phenylamino)-*N*-Phenyl benzamide, for two configurations, compound solution and compound doped PMMA as a film have been investigated. The compound was characterized by elemental analysis, FTIR, 1HMR, 13CNMR and theoretical study by using AM1-semi-empirical method. The optical properties were studied by using microscopic image surface, Fourier Transform Infrared (FT-IR), Atomic Force Microscopy images and an Ultraviolet–visible spectrometer. The thermal optical nonlinearity of organic compound has been studied by using Diode laser with the wavelength 473 nm. The samples were prepared by the microwave irradiation under solvent free condition within short time and appreciable yields. The Morphological structure dependence of the optoelectronic properties was also studied. The values of optical energy gaps to the direct (E_g^d) and indirect (E_g^{in}) for the compound doped film estimated to be 2.99 eV, 2.75 eV respectively. Optically smooth and homogeneous 2-(2,3-dimethyl phenylamino)-*N*-Phenyl benzamide doped Poly methyl methacrylate (PMMA) film was experimentally investigated for the surface distribution by scan with 2θ. Also, the spatial self-phase modulation (SSPM) is characterized. The observed induced patterns have been simulated numerically by using Fresnel-Kirchhoff's theory. The value of nonlinear refractive index n_2 in the case of compound solution is confirmed to have less value than in a compound doped film.

1 Introduction

In the present article, there are three basic research activities: synthesis, optimization, analysis and optoelectronic studies. The use of microwave irradiation (MW) to facilitate and enhance classic organic reactions has become a very development method [1–3] since, it leads to greater produce, purifier reactions and less time for reaction. In connection with solvent-free conditions, MW methods result in efficient and safe technology [4]. The development of laser technology has increased the interest and willingness of researchers to develop materials that did not possess desired optical properties. The organic compounds have a specific characterization comparing to the nonorganic materials, since they have high non-linear optical properties, high damage threshold, cheap in cost, as well as they have a flexible architectural. There are many organic materials used as an optical limiter such as porphyrins [5, 6], Schiff base dimer (SHBD) [7], malachite green [8], fullerenes [9, 10], 3,4-pyridinediamine [11], 3,4-diaminopyridine [12], [4-(2-hydroxy naphthylazo) phenyl] [2- (2-methoxy benzylideneamino)-5-methylphenyl] tellurium dibromide [13], Bismarck Brown Y dye [14], congo red dye [15], single crystal of Bis thiourea Zn acetate with metal organic [16], phloxine B [17], CuPC doped polymer [18], Violet 1-doped polyvinyl alcohol [19], Zn-PC/polymer as a composite film [20], 2,8-Phenazinediamine, N8, N8, 3-trimethyl hydrochloride (1:1) dye [21] and ethidium Bromide [22]. The significant progress of prepared materials with adjustable requirement of optical and optoelectronic characterizations is an important step for the development of optical devices and for awide range of applications. As

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