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Optical, Electrical and Structural Characterization of MNA Doped PS: PVS Polyblends Thin Film

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Abstract: *PS: PVC polyblend thin films doped with various concentration of Meta nitro aniline (MNA) (0.01 %, 0.05 %, 0.1 %, 0.5 %, 1 %, and 5 %) were synthesized by using the method of solution evaporation technique. The amorphous nature of doped thin film samples was confirmed by the X – Ray diffraction pattern which shows the decrease in intensity with the increase in the concentration of dopant. UV - vis spectra show increase in the absorption band with the increase percentage of dopant.The electrical conductivity study shows that the doping of MNA into the PS: PVC polymer blend thin film enhances its ionic conductivity with increase in temperature. This improved properties in the doped polyblend thin films are due to the increase in mobility of charge carriers.*

Keywords: PS, PVS, MNA Doped Polyblends, Optical Band Gap Energy, Electrical Conductivity

REFERENCES

[1]. M. Morsi, A. Rajeh, A. Menazea, Nanosecond laser-irradiation assisted the improvement of structural, optical and thermal properties of polyvinyl pyrrolidone/carboxymethyl cellulose blend filled with gold nanoparticles, J. Mater. Sci. Mater. Electron. 30 (2019) 2693–2705.

[2]. M. Morsi, A. Rajeh, A. Al-Muntaser, Reinforcement of the optical, thermal and electrical properties of PEO based on MWCNTs/Au hybrid fillers: nanodielectric materials for organoelectronic devices, Compos. B Eng. 173 (2019) 106957.

[3]. M. Morsi, A. Oraby, A. Elshahawy, R.A. El-Hady, Preparation, structural analysis, morphological investigation and electrical properties of gold nanoparticles filled polyvinyl alcohol/carboxymethyl cellulose blend, J. Mater. Res. Technol. 8 (2019) 5996–6010.

[4]. M. Morsi, M. Abdelaziz, A. Oraby, I. Mokhles, Structural, optical, thermal, and dielectric properties of polyethylene oxide/carboxymethyl cellulose blend filled with barium titanate, J. Phys. Chem. Solid. 125 (2019) 103–114.

[5]. I. Elashmawi, E. Abdelrazek, A. Hezma, A. Rajeh, Modification and development of electrical and magnetic properties of PVA/PEO incorporated with MnCl2, Phys. B Condens. Matter 434 (2014) 57–63.

[6]. N.M. El-sayed, F.M. Reda, O.F. Farag, D.A. Nasrallah, Surface analysis of nitrogen plasma-treated C 60/PS nanocomposite films for antibacterial activity, J. Biol. Phys. 43 (2017) 211–224.

[7]. A. Abdelghany, M. Meikhail, N. Asker, Synthesis and structural-biological correlation of PVC\PVAc polymer blends, J. Mater. Res. Technol. 8 (2019) 3908–3916.

[8]. A. Al-Muntaser, A. Abdelghany, E. Abdelrazek, A. Elshahawy, Enhancement of optical and electrical properties of PVC/PMMA blend films doped with Li4Ti5O12 nanoparticles, J. Mater. Res. Technol. 9 (2020) 789–797.

[9]. E. Abdelrazek, I. Elashmawi, A. Hezma, A. Rajeh, M. Kamal, Effect of an encapsulate carbon nanotubes (CNTs) on structural and electrical properties of PU/ PVC nanocomposites, Phys. B Condens. Matter 502 (2016) 48–55.

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[10]. A.M. El Sayed, Synthesis, optical, thermal, electric properties and impedance spectroscopy studies on P(VC-MMA) of optimized thickness and reinforced with MWCNTs, Results in Physics 17 (2020) 103025.

[11]. A.M. El Sayed, Synthesis, optical, thermal, electric properties and impedance spectroscopy studies on P(VC-MMA) of optimized thickness and reinforced with MWCNTs, Results in Physics 17 (2020) 103025.

[12]. J. Wu, T. Chen, X. Luo, D. Han, Z. Wang, J. Wu, TG/FTIR analysis on co-pyrolysis behaviour of PE, PVC and PS, Waste Manag. 34 (2014) 676–682.

[13]. E. Bozkır, N. Sarı, H. O¨ g˘ütcü, Polystyrene containing carbinolamine/azomethinepotentially useful as antimicrobial agent: synthesis and biological evaluation,J. Inorg. Organomet. Polym. Mater. 22 (2012) 1146–1155.

[14]. D. Zampino, T. Ferreri, C. Puglisi, M. Mancuso, R. Zaccone, R. Scaffaro,D. Bennardo, PVC silver zeolite composites with antimicrobial properties, J. Mater.Sci. 46 (2011) 6734–6743.

[15]. M. Rapa, P. Stoica, E. Tanase, E. Grosu, G. Vlad, Preparation of medical devices with antimicrobial properties, J. Optoelectron. Adv. Mater. 15 (2013) 807–816.

[16]. D.A. Nasrallah, M.A. Morsi, F. El-Sayed, R.A. Metwally Structural, optical and electrical properties of copper chloride filled polyvinyl chloride/polystyrene blend and its antifungal properties against Aspergillus avenaceus and Aspergillus terreus, Elsevier Composite communication Volume 22(2022), 100451.

[17]. Ahmed RM. Optical Study on poly (methyl methacrylate)/poly (vinyl acetate) blends. Int J Photoenergy 2009; 2009:150389.

[18]. Nouh AS, Benthami K, Elfadl AA, El-Nabarawy HA. Modification induced by gamma irradiation in polystyrene/poly (methyl methacrylate) blends. Int Polym Proc 2017;32(2):253–9.

[19]. SangawarVS&SaxenaMeeta,IndianJPhys83(2)163–169(2009)

[20]. Besare N G and Deogaonkar V S., Indian J of Pure & Applied Phys, 36, 280(1998)

[21]. Y. Madhava Kumar, K. Bhagyasree, N.O. Gopal, Ch. Ramu, H.Nagabhushana,Structural,ThermalandOpticalPropertiesofMn2+DopedMethacrylicAcid–EthylAcrylate(MAA:EA)CopolymerFilms,ZeitschriftfurPhysikalischeChemie,Vol.231, Issue.5,pp.1-17,2016.

[22]. Sangawar V S., D.C.electrical conductivity study of polystyrene & poly methylmethacrylateiodinedopedthermo–electrets,Ph.Dthesis,AmravatiUniversity,Amravati

[23]. SangawarV.S,P.SChikhalikar,RJDhokneAUUbaleSDMeshram,Bull.Mater Sci., Vol.29, No. 4,August 2006,pp413-416).

[24]. Ojha Pravakar, T. Siddaiah, N. O. Gopal, Ch. Ramu., Structural, Optical and Electrical conductivity studies of Mn2+ ions doped PVA/MAA: EA polymer blend films, Int. J of scientific Research in Physics and Applied Sciences, Vol. 6, Issue. 6, pp. 80 – 87, December (2018).