Cihat Boyraz
Marmara University - Department of Mechanical Engineering, 34854, Istanbul, Türkiye,
cboyraz@marmara.edu.tr
ORCID: 0000-0002-3508-7703

Lutfi Arda
Bahcesehir University - Department of Mechatronic Engineering, 34349, Istanbul, Türkiye,
lutfi.arda@eng.bau.edu.tr
ORCID: 0000-0003-0722-3891

Abstract. $Zn_{0.95-x}Ce_xCo_{0.05}O$ (x=0.00, 0.01, 0.02, 0.03, 0.04, and 0.05) nanoparticles obtained by the sol-gel method was used to create in order to investigate the impact of the Co/Ce co-doping on magnetic properties. By changing the doping levels (x=0.00, 0.01, 0.02, 0.03, 0.04, and 0.05), the stoichiometry was corrected. The structural properties of all Co/Ce co-doped ZnO nanoparticles were examined using X-ray diffraction, and the c/a ratios were used to demonstrate the presence of a hexagonal Wurtzite structure. Scaning electron microscopy (SEM) examination was used to assess the surface morphology, crystallite size, and nanoparticle morphologies. Electron Dispersive Spectroscopy (EDAX) was utilized to ascertain the elemental compositions. Magnetic characterizations were performed using the Quantum Design Vibrating Sample Magnetometer (QDVSM) instrument for all samples. Up to 10 kOe of magnetic field was used for the magnetization measurements as a function of magnetic field (M-H). Magnetization-temperature dependence measurements (M-T) were conducted in the 10-300 K temperature range.

Keywords: Co/Ce co-doped ZnO; Sol-gel method; Nanoparticles; Magnetic properties
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Employment of black phosphorous in nematic liquid crystals for enhancing their dielectric properties

Mouna El Abboubi
Department of Physics; Kocaeli University; 41001, İzmit, Türkiye,
186131006@kocaeli.edu.tr
ORCID :0000-0001-5745-0633

Mahpeyker Kocakoç Toprakoğlu
Department of Computer Technologies; Çukurova University; 01130, Adana, Türkiye,
mkocakoc@cu.edu.tr
ORCID: 0000-0001-7966-1482

Doğan Burak Aydın
Department of Physics; Kocaeli University; 41001, İzmit, Türkiye,
235131012@kocaeli.edu.tr
ORCID: 0000-0003-0563-9439

Leyla Taştan
Department of Physics; Kocaeli University; 41001, İzmit, Türkiye,
235131011@kocaeli.edu.tr
ORCID: 0009-0008-0968-2825

İdris Candan
Department of Physics; Kocaeli University; 41001, İzmit, Türkiye,
idris.candan@kocaeli.edu.tr
ORCID: 0000-0002-9950-713X

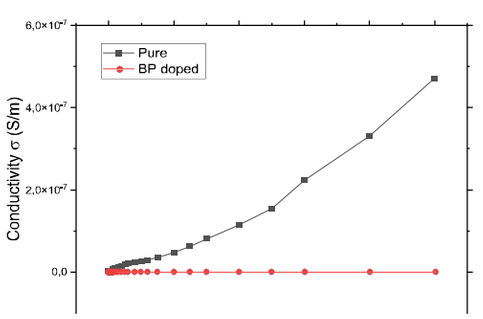
Sait Eren San
Department of Physics; Kocaeli University; 41001, İzmit, Türkiye,
saiteren.san@kocaeli.edu.tr
ORCID: 0000-0001-5042-4555

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Abstract. The study of nanomaterials is increasingly significant in material science, unveiling new opportunities for diverse applications. Among these materials, nematic liquid crystals (NLCs) are particularly valuable due to their unique optical properties and ability to self-assemble, making them suitable for various electro-optic applications. This research investigates the effects of black phosphorus (BP) as a dopant in NLCs, focusing on different weight percentages. BP, a two-dimensional material known for its excellent electrical conductivity and anisotropic properties, is anticipated to enhance the dielectric properties of NLCs, including the dielectric constant and response time. By establishing a clear relationship between BP concentration and the dielectric performance of NLCs, this study aims to contribute to the development of tunable materials for devices such as displays, sensors, and photonic applications. Ultimately, this work seeks to advance understanding of BP-doped NLC systems and their potential to drive innovation in liquid crystal technology.

Keywords: Black Phosphorus, Nematic Liquid Crystals, Electro-optic Applications, Anisotropic Materials, Electrical Conductivity.
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Figure 1 illustrates the conductivity-voltage (σ-V) characteristics, revealing how the inclusion of BP nanoparticles affects the conductivity of the NLCs. The corresponding real (ε') and imaginary (ε'') components of the dielectric constant as a function of voltage are shown in Figures 2(a) and (b), respectively.



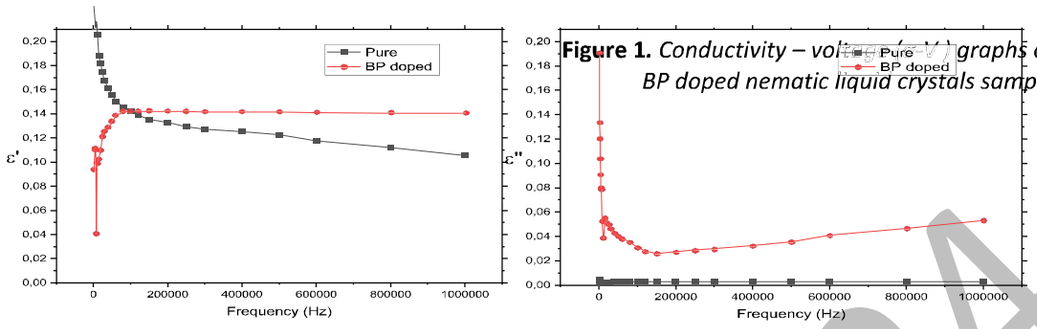


Figure 1. *Conductivity – voltage (σ - V) graphs of pure and BP doped nematic liquid crystals samples.*

Figure 2. ***(a)*** *The real;* ***(b)*** *the imaginary dielectric constant - voltage graphs of the pure and BP doped nematic liquid crystals samples.*

(a) **(b)**

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Investigation Of Some Physical Properties Of TiO_2 Films Produced By Ultrasonic Spray Pyrolysis Technique

Fatih Kılıçkan
Gazi University, Metallurgical and Materials Engineering, 06560, Ankara, Türkiye,
fatih.kilickan@gazi.edu.tr
ORCID: 0009-0003-4643-4306

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