11-084

Study of the Optical Properties of the Neodymium Doped PVDF Samples

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Polymer-based optical materials have received great attention from the researchers because of its increasing use in the optoelectronic applications, such as in polymer-based light-emitting diodes, light electrochemical cells and solar cells. PVDF can be easily processed and prepared to enhance optical properties to be used as optical switches, optical waveguides, light emitting diodes, lenses and nonlinear optical devices. Recently, studies have reported the utilization of PVDF as a hosting for rare earth ions or complexes, which enables the use in optical devices. Among them, neodymium (Nd3+) can be cited due to their high efficiency at room temperature. In this sense, PVDF matrix containing Nd3+ may be potentially used for several optoelectronic applications. Therefore, our objective in present study was synthesize films of PVDF doped with Nd3+ oxide and characterize their structural and optical properties by XRD, SEM, FT-IR, UV-Vis and Optical Fluorescence technique. X-Ray diffraction (XRD) measurements were done to analyze the crystallinity and amorphous structural behavior of the films. FT-IR measurements were done to calculate the relative percentage between alpha and beta phases, but no significant variation it was observed. UV-Vis is shown that the addition of Nd2O3 into PVDF matrix increases the optical absorbance spectrum at UV region. Fluorescence measurements showed a widening of emission band to the red region for all concentrations of PVDF/Nd. In summary, our results demonstrate that the Nd2O3 improves the natural fluorescence of the PVDF samples. Therefore, the obtained results indicate that the PVDF doped with Nd2O3 has a great potential to be applied in the optical area as a white light emitting devices.