

## OPTICAL AND STRUCTURAL PROPERTIES OF POLYVINYL ALCOHOL BASED POLARIZED FILMS MODIFIED WITH Ag-NANOPARTICLES AND IODINE

K.S. Dharmasiri<sup>2</sup>, H.A.M.M. Hapuarachchi<sup>1, 2\*</sup>, B.M.K. Pemasiri<sup>2</sup> and V.A. Seneviratne<sup>2</sup>

<sup>1</sup>Postgraduate Institute of Science, University of Peradeniya, Peradeniya, Sri Lanka

<sup>2</sup>Department of Physics, University of Peradeniya, Peradeniya, Sri Lanka

\*hammmalin@gmail.com

At present, polymer materials are being used for many applications due to their unique physical, mechanical, and optical properties. Many studies have been done on polyvinyl alcohol (PVA) polymer for various applications because PVA has some useful properties compared to many other polymers, such as, solubility in water, film-forming ability, and flexibility. Plasticizers can also be used in order to change some physical properties of PVA polymers. In this study, several modifications are done for the PVA films, which can be used as light polarizers. For this purpose, Ethylene glycol (EG) added PVA, Ag nanoparticles (NPs) added PVA, and Iodine added PVA films were tested for optical and structural characteristics using UV-Visible data and Powder X-ray diffraction (PXRD) data. The UV-Visible data for EG/PVA films show that adding EG to the PVA films decreases the transmittance of the film. The XRDs of EG/PVA films show that EG is decreasing the crystallinity of the PVA film. UV-Visible data of PVA/Ag-NPs films show that the addition of Ag nanoparticles reduces the films' transmittance in the visible region. Particularly the transmittance value is much lower at around 400 nm than that of pure PVA film, indicating more absorption of blue light. Therefore PVA/AgNPs films can be used as blue light filters. The addition of Ag nanoparticles can be used to increase the crystallinity of the PVA polymer matrix, which is vital for the strength of the film. UV-Visible data for stretched PVA/Iodine films show low transmittance compared to the pure PVA film in the visible region, which is almost equal above 700 nm.

**Keywords:** Ag-nanoparticles, Iodine, Polarizes, PVA