

# Preparation and Characterization of Pristine PMMA and PVDF Thin Film Using Solution Casting Process for Optoelectronic Devices

C. Rameshkumar<sup>1\*</sup>, S. Sarojini<sup>2</sup>, K. Naresh<sup>1</sup> and R. Subalakshmi<sup>3</sup>

<sup>1</sup>Department of Physics, Sathyabama University, Chennai - 600119, Tamil Nadu, India; crkpapers@gmail.com

<sup>2</sup>Department of Physics, Queen Mary's College, Chennai - 600004, Tamil Nadu, India

<sup>3</sup>Departments of Physics, Madras University, Chennai - 600009, Tamil Nadu, India

## Abstract

The PMMA and PVDF thin films were synthesized by solution casting process. The structural, spectroscopic, and morphological attributes of both the interface and surface of the film have been investigated. The structural properties of pristine PMMA and PVDF thin film were studied by XRD. The XRD spectra showed the detailed state of order and disorder of the system. From the XRD studies amorphous nature as well as the crystallinity (semi crystalline nature) of the polymer thin film were identified. SEM showed the surface morphology of the pristine PMMA and PVDF thin film. From the SEM image the size and the porous nature of the thin film were estimated. The UV showed the absorption characteristics of PMMA and PVDF thin films. From the UV-Visible spectra, we determined the direct and indirect optical energy gap of pristine PMMA and PVDF polymer samples by Devi's and Mott formula and Tauc's Expression. To the best of our knowledge, the direct and indirect energy gap in pristine PMMA and PVDF polymer thin films have been observed for the first time as no such report was found in literature survey.

**Keywords:** Polycrystalline Surfaces; Polycrystalline Thin Films; XRD; Visible/Ultraviolet Absorption Spectroscopy; Scanning Electron Microscopy (SEM), Optical Band Gap.