World Academy of Science, Engineering and Technology
International Journal of Chemical and Molecular Engineering
Vol:16, No:07, 2022

# Application of Molecular Materials in the Manufacture of Flexible and Organic Devices for Photovoltaic Applications

**Authors :** Mariana Gomez Gomez, Maria Elena Sanchez Vergara

**Abstract :** Many sustainable approaches to generate electric energy have emerged in the last few decades; one of them is through solar cells. Yet, this also has the disadvantage of highly polluting inorganic semiconductor manufacturing processes. Therefore, the use of molecular semiconductors must be considered. In this work, allene compounds C24H26O4 and C24H26O5 were used as dopants to manufacture semiconductors films based on PbPc by high-vacuum evaporation technique. IR spectroscopy was carried out to determine the phase and any significant chemical changes which may occur during the thermal evaporation. According to UV-visible spectroscopy and Tauc's model, the deposition process generated thin films with an activation energy range of 1.47 to 1.55 eV for direct transitions and 1.29 to 1.33 eV for indirect transitions. These values place the manufactured films within the range of low bandgap semiconductors. The flexible devices were manufactured: polyethylene terephthalate (PET), Indium tin oxide (ITO)/organic semiconductor/ Cubic Close Packed (CCP). The characterization of the devices was carried out by evaluating electrical conductivity using the four-probe collinear method. I-V curves were obtained under different lighting conditions at room temperature. OS1 (PbPc/C24H26O4) showed an Ohmic behavior, while OS2 (PbPc/C24H26O5) reached higher current values at lower voltages. The results obtained show that the semiconductors devices doped with allene compounds can be used in the manufacture of optoelectronic devices.

**Keywords :** electrical properties, optical gap, phthalocyanine, thin film.
**Conference Title :** ICMME 2022 : International Conference on Molecular Materials and Engineering
**Conference Location :** Berlin, Germany
**Conference Dates :** July 21-22, 2022