

## Synthesis, Characterization and Electrochemical Analysis of V-Shaped Disubstituted Thiourea-Chlorophyll Thin Film as Active Layer in Organic Solar Cells

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Conjugated thiourea system has attracted considerable attention as potential molecular framework to construct molecular components for molecular electronics. To date, thiourea systems are surprisingly unexplored although the well-known rigid  $\pi$ -systems enhance the development of molecular wire architecture to be applied as potential organic solar cell (OSC). Regarding to this matter, a study on the performance of conjugated V-shaped disubstituted thiourea compound systems to act as potential active layer in OSC was carried out prior to form photovoltaic thin film. The compound namely  $N^1, N^3$ -bis(4-(octyloxy)phenyl)- $N$ -(benzene-1,3-dicarbonyl) thiourea was spectroscopically and analytical characterized via Fourier Transform Infrared (FT-IR), UV-Visible Analysis (UV-Vis), CHNS elemental analysis,  $^1\text{H}$  and  $^{13}\text{C}$  Nuclear Magnetic Resonance (NMR), Thermogravimetric Analysis (TGA), Scanning Electron Microscopy (SEM) as well as Cyclic Voltammetry (CV) analysis. In turn, it was fabricated on Indium Tin Oxide (ITO) substrate before its conductivity behaviour, efficiency and OSC parameter were evaluated by Four Point Probe. From the electrical conductivity study, it revealed that the layer of ITO/V-shaped thiourea thin film exhibits higher conductivity,  $0.1377\text{Scm}^{-1}$  with the presence of chlorophyll (CHLO) under maximum light intensity of  $100\text{ Wm}^{-2}$ . Therefore, further evaluation of this type of molecular framework featuring thiourea moiety should be taken to enhance the development in the area of microelectronic devices.

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**Keywords:** Organic Solar Cell, Chlorophyll/Thiourea/ITO, molecular wire.