

Thiazolo [5,4-d] Thiazole Based Polymers and Investigation of Optical Properties for Electronic Applications

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Abstract : Electron donor or acceptor capability to participate in electron conjugation is the requirement for an electroactive material. Conjugated molecules and polymers bearing heterocyclic units have potential as optically electroactive materials. Thiazolo thiazole based compounds have attention for last two decades, because they have attractive electronic and optical properties, these compounds are useful for electronic application areas such as dye sensitized solar cells (DSSCs), organic light emitting diodes (OLEDs) and field effect transistors (FETs). Thiazolo[5,4-d]thiazole is bicyclic aromatic structure contains N and S atoms which act as electron donor. A new electron accepting or donating group bound to thiazolo [5,4-d] thiazole fused ring can change the electronic, spectroscopic, stability and dyeing properties of the new material. Polyphenylene(thiazolo [5,4-d] thiazole) (p-PhTT) compound was synthesized via condensation reaction of terephthalaldehyde with dithiooxamide. The chemical structure was determined with solid state ¹³C NMR spectroscopy. Optical properties (i.e. absorbance and band gap) was determined via solid UV-vis spectroscopy. The insoluble polymer was quarternized with 4-vinylbenzyl chloride (VBC). Colorless VBC changed into a yellow liquid. AgNO₃ complex were prepared and optical properties were investigated with UV-Vis, fluorescence spectroscopy and X-ray spectroscopy and cyclic voltammetry studies were examined in this research. This structure exhibits good absorbance and fluorescence in UV-vis region. Synthesis scheme of PyTT and preparation of metal complexes are given. PyTT has absorbance at ~360 nm and fluorescence at ~420 nm.

Keywords : thiazolo thiazole, quarternized polymers, polymeric ligands, Ag complexes

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