Title of the Thesis: "**Synthesis, Photophysical and Photoisomerization Properties of Stilbene-Appended Terpyridine Complexes of Iron and Zinc**".

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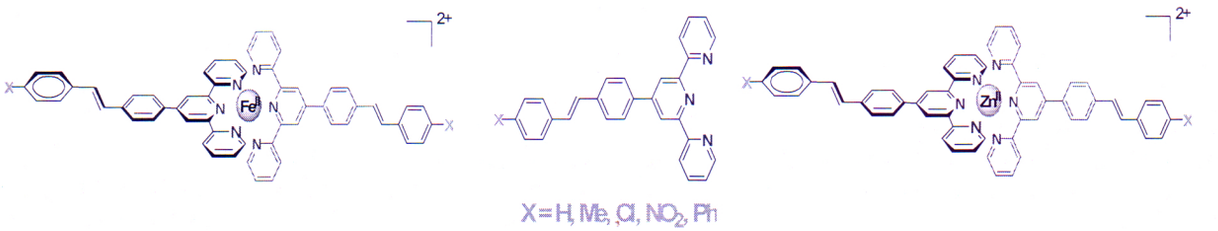
Abstract

This thesis deals with a series of styrylbenzene conjugated terpyridine ligands, tpy-pvp-X (where X = H, Me, Cl, NO_2, Ph) along with their homoleptic Fe(II) and Zn(II) complexes. All the ligands and the metal complexes were synthesized and thoroughly characterized by standard analytical tools and spectroscopic techniques. The photophysical properties of the complexes were studied via absorption and both steady state and time resolved emission spectroscopy. Taking advantage of the strylbenzene moiety, reversible *trans-cis* photoisomerization behavior of the complexes was thoroughly studied upon irradiating with UV and visible lights. The kinetic and thermodynamic parameters of the isomerization process were also estimated. Modulation in the rate and quantum yield of photoisomerization was done with respect to variation of the electronic nature of the substituent (X) as well as by the nature of the solvents. On-off and off-on luminescence switching upon successive irradiation with light of varying wavelengths is an important aspect of this dissertation. Utilizing the switching phenomena of the compounds, construction of molecular-scale logic devices were demonstrated in some cases. Theoretical investigations including DFT and TDDFT methods were performed for all the systems to get insight about their electronic structures as well as for proper assignments of experimentally observed spectral bands.
The thesis is comprised of six chapters and consists of 242 pages.



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