

**PHOTOINDUCED INTRAMOLECULAR AND INTERMOLECULAR
ELECTRONTRANSFER OF 5,10,15,20-TETRA-4 (N-PENTYLPYRIDYL)
PORPHYRIN**

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Charge injection and energy transfer processes of an excited singlet or triplet state of a photosensitizer are of immense important in a wide spectrum of photobiological and photochemical applications. Opto-electronic devices, photosensitized detoxification of toxic organic pollutants, photodynamic therapy for cancer etc, have been widely addressed as such possible applications.

Steady-state fluorescence of the free base 5,10,15,20-tetra-4(N- pentylpyridyl) porphyrin (H₂TpePyP) and its Zn derivative in methanol shows two bands around 650 and 720 nm corresponding to the Q(0,0) and Q(1,0) respectively. The fluorescence Quantum yield values measured for 5,10,15,20-tetra-4(pyridyl)porphyrin (H₂TpyP), H₂TpePyP and ZnTpePyP in methanol were found to be 0.082, 0.041 and 0.030 respectively. The decrease in the fluorescence Quantum yield may be attributed to quenching the fluorescence of porphyrin due to the presence of quaternary ammonium group and there by acting as an intramolecular electron acceptor. Increase in the polarity of the solvent, remarkably decrease the fluorescence Quantum yield and also shifts the emission to a longer wavelength.

In thermodynamic point of view an electron transfer from the ground state H₂TpePyP to O₂(³Σ_g) is not energetically favoured due to the high redox potential of H₂TpePyP/H₂TpePyP⁺ couple as compared to the potential of -0.35V for one electron reduction of O₂(³Σ_g). The oxidation potential recorded by cyclic voltammetry for H₂TpePyP in pH 6.0 phosphate buffer is +0.2 V and the estimated oxidation potential for excited H₂TpePyP*/H₂TpePyP⁺ couple is -1.7 V vs Ag/AgCl reference electrode. These data show the feasibility of intermolecular electron transfer from excited H₂TpePyP molecule to the ground state O₂.

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