**Abstract**

Synthesis of nanomaterials based on non-toxic, compatible bio-inorganic substances has gained attention these days for use in photonics, electronics and catalysis. The present study explored the impact of Cl axial ligands and pyridine protonation on the excitation properties of Sn (IV) tetrakis (4-pyridyl)porphyrin(SnTP)2+ and tetrakis 4-(sulfonatophenyl) porphyrin diacid [H4TPPS4]2- binary ionic porphyrin layers. The Sn(IV) core being highly electropositive, the interaction of the porphyrin layers in the presence of axially coordinated high electronegative Cl ligand was examined along with protonation at pyridine sites. Thus the basic structure and interaction properties of two porphyrin complexes namely, [H4TPPS4 …X’SnXTPyP]2- and [H4TPPS4 …X’SnXTPyHP]2+ with X’=X=Cl in the presence and absence of pyridine protons were explored using quantum chemical technique. The nature of interaction of the complexes was analyzed through the calculation of interaction energy. Further, the absorption properties of the complexes were analysed on the basis of frontier orbital energies and absorption spectra using TDDFT approach. The results indicated that the pyridine protonation on SnTP layers affected the overall properties of the complexes**.**