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Preparation of symmetrical tetraphenylporphyrin metal complexes and their spectroscopic studies photodynamic therapy to treat infections and cancers.

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Porphyrins molecules are gaining importance in the present era. Porphyrins are important part of biological molecules like hemoglobin and chlorophyll. Photosystem 1 and photosystem 2 are important sunlight trap in chloroplast. Electron transport chain is a series of chemical reaction in which energy is formed in the form of ATP (Adenosine triphosphate). The members of electron transport chains are cytochrome 450 which are porphyrins like molecules. Porphyrins are important part of solar cells, apart from above mentioned application; porphyrins have special importance in the photodynamic therapy. This therapy has special role in the treatment of acne, psoriases. Photodynamic therapy has successfully treated various kinds of malignant cells and has special role to treat cancers. The present thesis addresses the formation of tetra phenyl porphyrins through Adler and Ruthmend synthesis. This is the common chemical reaction which can be performed in the university laboratories. The tetraphenyl porphyrin, developed from above mentioned method was converted into metal complexes. Four metals iron, cobalt, copper and nickel have been chosen in the form of their chlorides and acetates. Porphyrin synthesis is a challenging approach as it contains various forms of impurities and it is very difficult to analyze the complex formation. The present studies covers different porphyrins metal complexes which have been developed and the formations of complexes were confirmed through IHNMR (nuclear magnetic resonance spectroscopy) analysis which is the strongest tool in the modern chemistry. The formation of complexes was further confirmed by infra-red spectroscopy and ultraviolet spectroscopy. Atomic force microscopy was also conducted to study the morphological features of tetraphenylporphyrin and its metal complexes.

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