Spectroscopic investigation of porphyrins and Ln(III) porphyrins

S. Radzki\textsuperscript{a}, R.J. Wiglus\textsuperscript{b}, J. Legendziewicz\textsuperscript{b} A. Graczyk\textsuperscript{c} and P. Gawryszewska\textsuperscript{b}

\textsuperscript{a} Faculty of Chemistry, M Curie-S\'odowska University of Lublin, 20-031, Lublin, Poland
\textsuperscript{b} Faculty of Chemistry, University of Wroclaw, 50-383 Wroclaw, Poland
\textsuperscript{c} Institute of Optoelectronics, Military Technical University, Warsaw, Poland

Upper emission excited-state has been observed for variety of diamagnetic metal porphyrins. In the paramagnetic systems emission depends on the position of CT, d-, and f- excited states which take part in the porphyrin emission quenching.

Characteristic Q and S (Soret) bands of metal porphyrins in the visible region are assigned to excited S\textsubscript{1} singlet and the second excited S\textsubscript{2} states. Recently we have reported the absorption, IR and Raman spectra of porphyrin and Tb(III) porphyrin in solid and solution. Spectroscopic investigation have been done at room temperature. Correlation of the spectroscopic results in solids and solutions was made and the role of solvent molecules in modifications of the structure of porphyrin complex in solutions was considered.

Now we present spectroscopic investigation of new types of water soluble porphyrins (PP(Ser)\textsubscript{2}(Arg)\textsubscript{2}, their interaction with lanthanide ions (Pr, Eu and Yb) as well as emission of H\textsubscript{2}TPP porphyrin and TPPTb(III)acac compound. The relation of the intensity of the porphyrin emission on oxygen concentration in solution as well as energy of the excitation beam were studied. It was found that efficiency of emission depends on Ln(III) ion concentration in solution. The observed phenomenon is analyzed and the mechanisms of the excited states dynamics are considered.