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Electrochemical, *in-situ* spectroelectrochemical and *in-situ* electrocolorimetric characterization of peripherally and non-peripherally substituted metal free and metallophthalocyanines

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Phthalocyanine (Pc) complexes have attracted considerable attention of many scientists and researchers due to their industrial and technological applications such as dyes and pigments, chemical sensors, photodynamic therapy, solar cells, electrochemical energy conversion and storage, electrochromic devices, photovoltaics, and catalysis. With the conjugated 18 electrons system, Pcs display ligand and/or metal based redox processes. Electrochemical redox behavior of these compounds can be modified in a broad scale by changing the nature and number of peripheral or nonperipheral substituents and the metal ion in the center. The detailed identification of their redox properties has vital importance for the determination of the possibility of the usage of novel Pc compounds in the technological applications. In the present work, electrochemical redox behaviors of peripherally and non-peripherally substituted mononuclear metal-free and zinc (II) Pc compounds were investigated by the techniques of cyclic voltammetry and square wave voltammetry on a Pt working electrode in de-aerated nonaqueous solvent medium involving TBAP as the supporting electrolyte. The identified redox data included the half-peak potentials for the redox processes ($E^{1/2}$), anodic to cathodic peak potential separations (ΔE_p), peak current ratios (I_{pa}/I_{pc} for reduction and I_{pc}/I_{pa} for oxidation) and the potential difference between the first half-peak oxidation and reduction processes ($\Delta E_{1/2}$). Electrocolorimetry supported *in-situ* spectroelectrochemistry of the compounds were also studied since it is not possible to completely identify the nature of the redox processes and the influence of some side-effects such as metal coordination and aggregation.

Biography

Efe Baturhan Orman received his PhD in physical chemistry at Marmara University, Istanbul -TURKEY in 2017. He has been working as a research assistant at Marmara University since 2006. His interests are electrochemical, electrocatalytic and electrocolorimetric properties of organic molecules and their applications in thin films and modified electrodes.

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