Electrochemical and electrocatalytic oxygen reducing properties of metal phthalocyanines involving tertiary butyl and Oxo Bridging Groups

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Phthalocyanines (Pcs) have varied chemistry resulting from their rich π -electron system. These compounds have been receiving increasing interest of researchers, due to the presence of various synthetic pathways for their cost-effective preparation and applicability in many areas such as photodynamic therapy, non-linear optics, electrocatalysis, electrochromism and sensors. Another important pluspoint of these complexes is the modification ability of their main skeleton with various central metals and peripheral or non-peripheral substituents. Thus, various functional monomeric MPc derivatives and their dimeric or multimeric derivatives with different kinds of bridging units or linkages could be designed. In this study, the electrochemical redox properties of the novel Pc compounds involving tertiary butyl and oxo bridging groups have been identified by classical voltammetric techniques and *in-situ* spectroelectrochemistry. These properties allow the determination of the compounds which have the ability to show high catalytic activity and thus, suitable for preparing electrocatalyst for oxygen reduction reaction (ORR). Electrocatalytic performance measurements have been made with cyclic voltammetry, linear sweep voltammetry, chronoamperometry and hydrodinamic rotating disc and rotating ring-disc voltammetry techniques. These measurements were performed with glassy carbon electrodes modified suitably with a Pc compound, a carbon-based supporting material and Nafion as binder. Some catalytic measurements were carried out both in the absence and in the presence of O_2 in solution or Pc compound in the catalyst ink with the aim of evaluating their electrocatalytic ORR performances and the relation with their general surface redox behaviours. Electrocatalytic measurements were performed in both acidic and basic aqueous media in order to understand appliciability in fuel cells and metal-air batteries.

Biography

Tarifa Kaniz has completed her Bachelor's and Master degree from her country, Bangladesh. She is now doing her PhD in Marmara University. During this period, she is also working in a project related with the identification of the electrocatalytic performances of various phthalocyanine compounds for oxygen reduction.

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