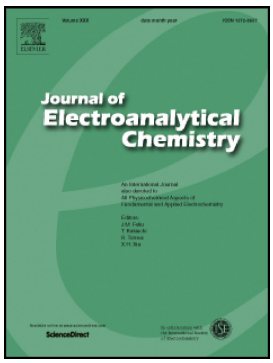

Electrocatalytic activity of a push-pull phthalocyanine in the presence of reduced and amino functionalized graphene quantum dots towards the electrooxidation of hydrazine

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Abstract

We report on the electrochemical behaviour of reduced graphene quantum dots (rGQDs) compared to amino functionalized graphene quantum dots (NH_2GQDs). Reduction of the GQDs entails the elimination of the excessive carboxyl and hydrogen groups on the GQDs surface, thereby reducing the energy band gap. The energy band gap of graphene is directly proportional to the available oxygen atoms. The two GQD types were conjugated to a novel cobalt phthalocyanine (cobalt tris-(tert-butyl phenoxy)-mono-carboxyphenoxy phthalocyanine, CoPc) via covalent and nom-covalent interactions. The resulting conjugates were tested towards the electrooxidation of hydrazine. The conjugates are represented as rGQDs(π)CoPc, NH_2(π)CoPc, rGQDs@CoPc and NH_2GQDs@CoPc. The resulting conjugates were adsorbed onto a glassy carbon electrode using the drop and dry method. The lowest limit of detection (LOD) was obtained for rGQDs(π)CoPc.

Keywords: cobalt phthalocyanines, graphene quantum dots, hydrazine, cyclic voltammetry, electrocatalysis.

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