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| Title: | Synthesis, crystal structures and electrocatalytic water oxidation by Mn(II), Co(II) and Ni(II) complexes of thiophene-2-carbohydrazide |
| Authors: | Prashanth, Billa (/jspui/browse?type=author&value=Prashanth%2C+Billa) Singh, Sanjay (/jspui/browse?type=author&value=Singh%2C+Sanjay) |
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| Abstract: | Electrocatalytic water oxidation by molecular electrocatalyst has emerged very rapidly. Here, metal complexes of Mn(II), Co(II), and Ni(II) containing Thiophene-2-carbohydrazide were synthesized and characterized by spectroscopic and single crystal X-ray techniques. The complexes 1, 2, and 3 crystallize in monoclinic, orthorhombic, and monoclinic systems with space groups P2 ₁ /c, Pca2 ₁ , and P2 ₁ /c, respectively. The crystal structure of complexes is stabilized via various intermolecular hydrogen bonding including N-H...Cl, O-H...Cl, O-H...O, N-H...O, C-H...S etc. providing supramolecular architectures. The prepared metal complexes [Mn(tpch) ₃] ²⁺ (1), [Co(tpch) ₃] ²⁺ (2), and [Ni(tpch) ₃] ²⁺ (3) were coated on glassy carbon electrodes (GCE). Nafion (Nf) solutions were used during the immobilization process to provide an electroactive surface on GCE (GCE/Nf). Electrochemical characterizations of modified electrodes were achieved from the results of cyclic voltammetry and linear sweep voltammetry techniques. GCE modified GCE/Nf/Complex-1, GCE/Nf/Complex-2, and GCE/Nf/Complex-3 show efficient electrocatalytic activity for oxygen evolution reaction (OER). Tafel slope of GCE/Nf/Complex-2 and GCE/Nf/Complex-3 was found lower than commercial benchmark electrocatalyst RuO ₂ and IrO ₂ . |
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