Syntheses, crystallographic characterization, catecholase activity and magnetic properties of three novel aqua bridged dinuclear nickel(II) complexes.

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Streszczenie

Three novel μ_2-aqua bridged dinuclear Ni(II) complexes, $[Ni_2(HL^1)_4(H_2O)]$ (**1**), $[Ni_2(HL^2)_4(H_2O)]$ (**2**) and $[Ni_2(HL^3)_4(H_2O)]$ (**3**) have been synthesized using Schiff base ligands derived from 5-amino-1-pentanol and salicylaldehyde (H_2L^1), 5-bromo salicylaldehyde (H_2L^2) and 3-methoxy salicylaldehyde (H_2L^3), respectively. They are characterized by a variety of physical techniques including elemental analysis, infrared and UV–Vis spectroscopy, NMR, cyclic voltammetry, variable temperature magnetic measurements and single crystal X-ray diffraction. X-ray crystallographic analysis reveals that all the three complexes possess distorted octahedral environment with a bridging aqua ligand. Complexes **1** and **3** exhibit 3D supramolecular architecture whereas **2** demonstrates a 2D netlike arrangement along ab plane. Catecholase activity of the dinuclear Ni(II) systems are investigated using 3,5-di-tert-butylcatechol as the substrate. The complexes are efficient catalysts with turnover numbers 1.87×10^4, 1.79×10^4 and 1.38×10^4 h^{-1} for **1**, **2** and **3**, respectively. The probable structures of the intermediates formed during the process are proposed on the basis of kinetic and spectral analyses. The magnetic data disclose that weak ferromagnetic couplings are transmitted between the metal centers and the magnetic properties are correlated with the structural features around the Ni(II) centers.

Słowa kluczowe

Dinuclear Ni(II) complex, Aqua bridged, Crystal structure, Catechol oxidation, Ferromagnetic

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