Synthesis, crystal structure and ligand based catalytic activity of octahedral salen Schiff base Co(III) compounds

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Abstract

Two octahedral cobalt(III) compounds ($[CoL^1CN(H_2O)]\cdot DMF$ (**1**) and $[CoL^2L^3] \cdot H_2O$ (**2**)) were synthesized by using two Schiff bases H_2L^1 and H_2L^2 and well-characterized by different spectral methods. Catalytic ability of the compounds were studied by the catecholase oxidation reaction. Among the two compounds, compound **2** with bare aldehydic type coligand catalysed the 3,5-di-tertiarybutylcatechol (3,5-DTBC) into the corresponding quinone. Here, the nature of the ligand exhibited a significant role in the oxidation of the substrate. A catalytic loop is proposed to explain the mechanistic aspect of the reaction and different kinetic parameters (V_{max} (3.31×10^{-3} M) and K_M (3.43×10^{-3} M min^{-1}) were also determined.

Keywords: Co(III), Crystal structure, Octahedral Salen-type, Catecholase activity.

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