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Synthesis and characterization of diphenyl dithiophosphates of nickel(II)

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Abstract

Five novel nickel(II) complexes of disubstituted diphenyldithiophosphate corresponding to $[\{(ArO)_2PS_2\}_2Ni]$ *[Ar =* $2,4\text{-}(CH_3)_2C_6H_3$ ***(1)***, $2,5\text{-}(CH_3)_2C_6H_3$ ***(2)***, $3,4\text{-}(CH_3)_2C_6H_3$ ***(3)***, $3,5\text{-}(CH_3)_2C_6H_3$ ***(4)*** *and* $4\text{-Cl-}3\text{-}CH_3C_6H_3$ ***(5)****] have been synthesized in the aqueous medium and structurally characterized by IR, heteronuclear NMR (*^1H, ^{13}C *and* ^{31}P*) spectroscopic and single crystal X-ray analyses. Complexes **1** and **5** crystallize in the triclinic space group P1, whereas complex **4** crystallizes in the monoclinic space group* $P2_1/n$*. In these complexes, the ligands are coordinated to the nickel ion as a bidentate chelating agent via the two thiolate sulfur atoms leading to spirocyclic system. Crystal structure determination of the complexes **1, 4** and **5** reveals that the complexes consist of mononuclear units with nickel(II) ion coordinating in a bis-bidentate fashion and has distorted square planar coordination environment. Cyclic voltammetry experiment was used to probe the redox capabilities of the complex **4**. The investigated complexes along with the ligands have been screened for in vitro antifungal activities against the fungus Penicillium chrysogenum.*

Keywords: Diphenyl dithiophosphate, Cyclic voltammetry, Single crystal X-ray, Antifungal.