

Magnetic properties of cobalt dioxolene complexes with tetradentate N-donor base

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Investigation of metal complexes with redox-active ligands (*o*-benzoquinones and their imines) is one of the intensively developing fields of organometallic and coordination chemistry. Valence tautomerism (VT), also called redox-isomerism, is a unique phenomenon observed in metal coordination compounds, that involves a reversible intramolecular electron transfer between a metal center and a redox-active ligand (or ligands) caused by the action of temperature, pressure, irradiation, or electric field. Compounds capable of VT represent promising candidates for the design of molecular switches, photoresponsive devices or key substructures of molecular electronics and spintronics.

In this work a family of octahedral complexes [(Me₂TPA)Co(36-Cat)] **1**, [(Me₂TPA)Co(36-Cat)]PF₆ **2** and [(Me₂TPA)Co(diox-(OMe)₃)]BPh₄ **3** (Me₂TPA = bis(6-methyl-2-pyridyl)methyl)-(2-pyridylmethyl)amine; 36-Cat = dianion of 3,6-di-*tert*-butylcatechol; diox-(OMe)₃ – 2,5-di-*tert*-butyl-6-oxy-3,4,4-trimethoxy-cyclohexa-2,5-dienone) have been synthesized and their magnetic properties investigated. The neutral complex **1** was found to form a hexa- (CoO₂N₄) and pentacoordinated (CoO₂N₃) isomers, possessing different structure and magnetic behavior. One electron oxidation of **1** gives rise the ionic complex **2**, demonstrating thermally induced VT transition (_{LS}Co^{III}-Cat → _{HS}Co^{II}-SQ) in the solid state. An aerial oxidation of **1** results in the formation of ionic complex of _{HS}Co^{II} bearing cyclohexadienonate ligand - **3**. Compounds **1** and **3** were found to demonstrate slow magnetic relaxation at applied fields of 1500-2500 Oe.

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