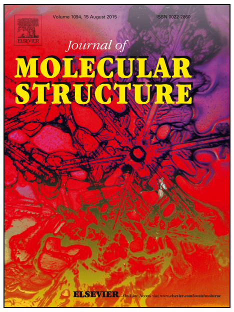

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Synthesis, physicochemical analysis of two new hemilabile ether-phosphine ligands and their first stable *bis*-ether-phosphine/Cobalt(II) tetrahedral complexes

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Abstract

New tridentate ether-phosphine {P, 2O} and ether-phosphine oxide {OP, 2O} ligands with P and O donor-atoms have been synthesized starting from $ClCH_2CH(OCH_3)_2$. The oxidation process of $Ph_2PCH_2CH(OCH_3)_2$ to its oxide derivative $Ph_2P(=O)CH_2CH(OCH_3)_2$ was monitored by ^{31}P-NMR for the first time. The desired ligands and their Co(II) complexes structures were deduced from IR, EA, MS, NMR, UV-Vis., TG/DTG and XRD physical measurements. The tridentate chelating coordination behavior of the ether-phosphine wasn't detected leading only to the mono-dentate coordination mode through the phosphorous atoms to set up a $X_2Co[\eta^1\text{-}Ph_2PCH_2CH(OCH_3)_2]_2$ as final isomer formula (X = Cl or Br). The $Cl_2Co[\eta^1\text{-}Ph_2PCH_2CH(OCH_3)_2]_2$ isomer belongs to complex **1** was supported by single crystal measurement. Polar/non-polar intermolecular short contacts were detected by XRD and Hirshfeld surface theoretical analysis.

Keywords: Cobalt(II) complexes; P~O Hemilabile ligands; XRD; Hirshfeld surface analysis.

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