

Title: Coordination compounds derived from R-phenylcyanamido ligands and cobalt (II)

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Five compounds have been synthesized in this work: $[\text{Co}_4(\mu_3\text{-py}_2\text{C}(\text{OH})\text{O})_4(4\text{-Br-3-CF}_3\text{-PhNCN})_2(\text{PhCOO})_2]$ (**1**), $[\text{Co}_4(\mu_2\text{-py}_2\text{C}(\text{OH})\text{O})_2(\mu_3\text{-py}_2\text{C}(\text{OCH}_3)\text{O})_2(\mu_2\text{-4-Cl-PhNCN})_2(4\text{-Cl-PhNCN})_2]$ (**2**), $[\text{Co}(\text{py}_2\text{C}(\text{OH})\text{O})(\text{py}_2\text{C}(\text{OCH}_2\text{CH}_3)\text{O})][\text{NO}_3]\cdot 3\text{H}_2\text{O}$ (**3**), $[\text{Zn}_2\text{Tb}(\mu_2\text{-py}_2\text{C}(\text{OCH}_2\text{CH}_3)\text{O})_3(\mu_3\text{-py}_2\text{C}(\text{OCH}_2\text{CH}_3)\text{O})(\text{NO}_3)(\text{H}_2\text{O})][\text{Tb}(\text{NO}_3)_5]$ (**4**) and $[\text{Dy}_5\text{Co}_4(\text{py}_2\text{C}(\text{OH})\text{O})_4(\mu_3\text{-py}_2\text{CO}_2)_4(\mu_4\text{-py}_2\text{CO}_2)_2(\text{O})_2(\text{H}_2\text{O})_6(\text{NO}_3)_2][\text{NO}_3]_5]$ (**5**). The metal ions of the five compounds are connected through oxo-bridges from the Di(2-pyridil) ketone derivatives formed after solvolysis and a posterior deprotonation Fig.1. In addition the Co(II) atoms of compound **2** are connected by two R-phenylcyanamides in the *end-on* coordination mode Fig.2. The magnetic susceptibility measurements were performed for compounds **1**, **2**, **4** and **5**. Compound **1** and **2** exhibit a ferromagnetic coupling between the Co(II) metal ions. Compound **4** shows paramagnetic behaviour and **5** exhibit weak antiferromagnetic coupling between the Dy(II) ions. Compounds **1**, **2** and **5** show SMM (Single Molecular Magnet) behaviour. The relaxation time of magnetization hasn't been calculated.

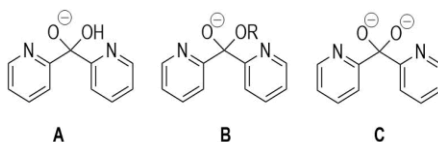


Fig.1. Dpk derivatives after deprotonation: $\text{py}_2\text{C}(\text{OH})\text{O}^-$ (A), $\text{py}_2\text{C}(\text{OR})\text{O}^-$ (B) and $\text{py}_2\text{CO}_2^{2-}$ (C)

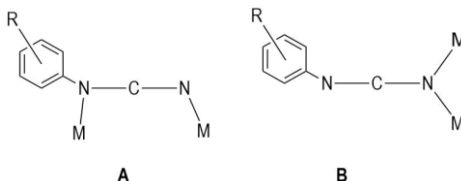


Fig.2. *End-to-end*(A) and *end-on*(B) coordination modes of R-phenylcyanamido ligands