

# New complex resulting of the interaction of 2,4,6-tris(2-pyrimidyl)-1,3,5-triazine (TPymT) with cobalt(III): synthesis, crystal structure and magnetic properties

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The copper(II) assisted hydrolysis of 2,4,6-tris(2-pyrimidyl)-1,3,5-triazine (TPymT) in warm aqueous solution leads to the stable mononuclear copper(II) complex of formula  $[\text{Cu}(\text{bpcam})(\text{H}_2\text{O})_3]^+$  [bpcam = bis(2-pyrimidylcarbonyl)amidate]<sup>1</sup>. Recently was described that cobalt(II) ion also is able to promote the hydrolysis under the same conditions of described for copper(II) yielding complexes of formula  $[\text{Co}(\text{bpcam})_2]\text{X}\cdot 7.5\text{H}_2\text{O}$  [X = Cl or Br], in which the ion was oxidized to cobalt(III)<sup>2</sup>. In this work we described a new salt of  $[\text{Co}(\text{bpcam})_2]^+$  which the counter ion is  $[\text{Co}(\text{SCN})_4]^{2-}$  that gives the paramagnetic behavior to this compound. The complex  $[\text{Co}(\text{bpcam})_2]_2[\text{Co}(\text{SCN})_4]\cdot \text{DMSO}\cdot \text{H}_2\text{O}$  was synthesized by reacting a solution of  $\text{Co}(\text{NCS})_2$  (0.5mmol) with TPymT (0.5mmol) and slow evaporation of solution afforded green block-like crystals that were suitable for X-ray diffraction. The powder sample was obtained by addition of NaSCN (0.5mmol) in reaction mixture (yield 87%). IR (KBr,  $\text{cm}^{-1}$ ): ( $\nu$  SCN): 2078s; ( $\nu$  C=O): 1733s. The X-ray diffraction shows that the compound consists of two non-equivalent molecules of  $[\text{Co}(\text{bpcam})_2]^+$ , one  $[\text{Co}(\text{SCN})_4]^{2-}$  that acts as counter ion, one DMSO and one  $\text{H}_2\text{O}$  in the structure that are all connected by hydrogen bonds. The Co(III) assumes a very distorted octahedral geometry due to stiffness of ligand bpcam. The variable-temperature measurements indicated that  $\chi_M T$  product gradually decrease with cooling from  $2.71 \text{ cm}^3 \text{ K mol}^{-1}$  at 300 K which are much higher than the spin-only value ( $1.875 \text{ cm}^3 \text{ K mol}^{-1}$ ) for an isotropic Co(II) ion [ $S = 3/2$ ,  $g = 2.0$ ], indicating strong spin-orbit coupling effects.

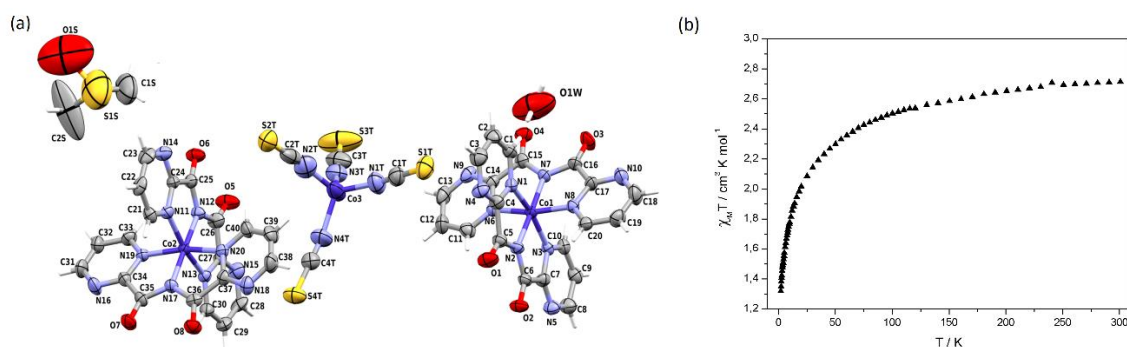


Figure 1: (a) Asymmetric unit of  $[\text{Co}(\text{bpcam})_2]_2[\text{Co}(\text{SCN})_4]\cdot \text{DMSO}\cdot \text{H}_2\text{O}$ ; (b) The  $\chi_M T$  vs  $T$  plot of  $[\text{Co}(\text{bpcam})_2]_2[\text{Co}(\text{SCN})_4]\cdot \text{DMSO}\cdot \text{H}_2\text{O}$  at 5 kOe.

## References

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