MAGNETISM of $Co(CO_3)(OH_2)_2(C_3H_4N_2)_2$

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9.7 cm

The carbonatodiaquobisimidazolecobalt(II) $Co(CO_3)(OH_2)_2(C_3H_4N_2)_2$ crystalizes in a monoclinic structure with the space group *A2/a* (Baraniak *et al.*, J. Chem. Soc. (A) 2559 (1970)). In this contribution, we report on a detailed investigation of X-ray powder diffraction, magnetization *M(T, H)* and specific heat $C_p(T,H)$ for a polycrystalline sample of $Co(CO_3)(OH_2)_2(C_3H_4N_2)_2$. Based on X-ray powder diffraction data, we confirm the monoclinic structure with the following lattice parameters: a = 10.114(5), b = 7.513(3), c = 14.129(6) Å, and β = 99.564(7) °. The magnetic susceptibility ($\chi = M/H$) in the temperature range 20 - 400 K can be fitted with the Curie-Weiss law with the effective moment $\mu_{eff} = 5.2\ \mu_B$/Co and the paramagnetic temperature Curie θ_p = - 6.9 K. Thus, the $^4T_{1g}$ ground state for Co^{2+} has found to show an unquenched spin-orbit coupling and a weak antiferromagnetic interaction between Co ions. Application of magnetic field significantly affects the magnetization and specific heat at $T < 20$ K. Anomaly observed in $C_p(T,H)$-dependences may be interpreted in terms of a non-vibrational contribution to the thermal properties (Schottky system).

13.4 cm

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