

Magneto-optical and structural investigations of five dimeric cobalt(II) complexes mimicking metalloenzyme active sites

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Four novel cobalt(II) complexes mimicking metalloenzyme active sites, novel $C_{14}H_{22}Cl_2Co_2O_{13}$ (1), $C_{28}H_{36}Cl_4Co_4O_{28}$ (2), $C_{16}H_{22}Cl_2Co_2O_{13} \cdot 2HCl$ (3), $C_{16}H_{22}Cl_2Co_2O_{13}$ (4), and one known $C_{40}H_{78}Cl_8Co_2O_{17}$ (5) are composed of the same core of two high-spin cobalt(II) centers triply bridged by water and two trichloroacetato (1-4) or two pivalate (5) groups but differ in terminal ligands. The crystal structures of new compounds 1-4 belong to the space groups $P1$, $P2_1/c$, $P1$, and $Pbcn$, respectively. All five investigated complexes contain Co atoms in distorted octahedral coordination. The complexes were characterized by magnetic susceptibility and magnetization measurements and by variable-temperature variable-field magnetic circular dichroism spectroscopy. Experimental data were analyzed in the frame of the theoretical model, which includes an unquenched orbital moment of the Co II ions. All investigated compounds are antiferromagnetically coupled.