Magnetic properties of a cobalt(II) dimer of pseudo tetrahedral geometry [Co2{(CO)9Co3C-COO}5, C14H19N2H]

Calvo-Perez, Victor

Spodine, Evgenia

The crystalline ion pair [Co2{OOC-CCo3(CO)9}5, C10H6(N(CH3)2)2H] (1) presents unusual magnetic properties. The X-band EPR spectrum of 1 at room temperature presents two unresolved bands at g = 1.98 and 4.55. At a low temperature (20 K), the cluster of clusters 1 presents a complicated spectrum with an intense signal at 1700 G. The magnetic susceptibility of 1 was fit to a two spin S1 = S2 = 3/2 Heisenberg model, with J = 11.2 cm-1 and a g value of 2.3. There is no field dependence of the magnetization, which suggests intramolecular coupling between the two tetrahedral centers of the cluster. Molecular orbital modeling indicates a sigma path of exchange between two topologically non-equivalent cobalt(II) centers.