

Crystal Structure and Magnetic Properties of a New Hetero-Dinuclear Cu^{II}Mn^{II} Schiff Base Complex

Y. Elerman^a, A. Elmali^a, C. T. Zeyrek^b, I. Svoboda^c, and H. Fuess^c

^a Department of Engineering Physics, Faculty of Engineering, Ankara University, 06100 Besevler-Ankara, Turkey,

^b Turkish Atomic Energy Authority, Ankara Nuclear Research and Training Centre, 06100 Besevler-Ankara, Turkey,

^c Institute for Materials Science, Darmstadt University of Technology, Petersenstraße 23, D-64287 Darmstadt, Germany

Reprint requests to A. Elmali. E-mail: elmali@eng.ankara.edu.tr

Z. Naturforsch. **58b**, 271 – 277 (2003); received November 15, 2002

Mn[Cu(L)(O₂CMe)₂].H₂O (L = N,N'-bis(2-hydroxy-3-methoxybenzylidene)-1,3-diaminopropane) was synthesized and the crystal structure determined. (C₂₃H₂₆CuMnN₂O₈).H₂O, monoclinic, space group *P*2₁/*c*, *a* = 12.017(3), *b* = 8.217(3), *c* = 24.786(4) Å, β = 92.10(2)°, *V* = 2446(1) Å³, *Z* = 4. The crystal structure consists of ordered dinuclear units with Cu^{II} and Mn^{II} ions bridged by two oxygen atoms of the Schiff base ligand. The Cu^{II} coordination sphere is a slightly distorted square-plane formed by the N₂O₂ donor set of the Schiff base ligands. The average Cu—O and Cu—N distances are 1.920(1) and 1.957(4) Å, respectively. The coordination around the Mn^{II} ion is a distorted tetrahedron with the donor oxygen atoms of the Schiff base ligands and oxygen atoms of the acetate anions. The Cu···Mn separation is 3.327(4) Å. There is also one non-coordinating water molecule in the crystal structure. The χ and χ_T versus *T* plots, χ being the molar magnetic susceptibility per Cu^{II}Mn^{II} unit and *T* the temperature, has been measured in the 4.9–301 K temperature range. The values of the interaction parameters are *J* = −28.3 cm^{−1}, g_{Mn} = 2.01, g_{Cu} = 2.07. This indicates an intramolecular antiferromagnetic interaction between Cu^{II} and Mn^{II} ions.

Key words: Hetero-Dinuclear Cu^{II}Mn^{II} Complex, Super-Exchange Interactions, Antiferromagnetic Interaction