Comparative magnetic studies of (Sm, Nd) trichloroacetates and their heteronuclear $CuLn_2(CCl_3COO)_8 \cdot 6H_2O$ systems: structure and spectroscopy of a new type of Eu trichloroacetate.

Autorzy

W. Wojciechowski

Janina Legendziewicz

Małgorzata Puchalska

Zbigniew Ciunik

Rok wydania

2004

Czasopismo

Journal of Alloys and Compounds

Numer woluminu

380

Strony

285-295

DOI

10.1016/j.jallcom.2004.03.056

Kolekcja

Naukowa

Język

Angielski

Typ publikacji

Artykuł

Streszczenie

Two series of compounds: heteronuclear $CuLn_2(CCl_3COO)_8 \cdot 6H_2O$ (Ln = Nd and Sm) and their simple analogues $Ln(CCl_3COO)_3 \cdot 2H_2O$ (Ln = Eu, Nd, Sm) were synthesized. New Eu(III) trichloroacetate; $Eu(CCl_3COO)_3 \cdot 3H_2O \cdot CH_3OH$ was obtained, its molecular structure was determined by X-ray diffraction and compared with the data of respective systems reported earlier. Magnetization was measured and the susceptibility was derived in the limit of low field. Magnetic susceptibilities were calculated and discussed for series of homo- and hetero-nuclear chloroacetates. Untypical hysteresis was found (two loops) in samarium trichloroacetate. This phenomenon is most probably the effect of flops of spins in magnetic fields of 30,000 Oe and very weak (if any) interaction intermediated by weak hydrogen bonding between the chains. A similar magnetic behavior was observed in neodymium carboxylate where the magnetic ordering was observed as a result of Nd–Nd interaction at low temperature (1.6 K). For this system, the magnetic moment depends on magnitude of the magnetic field and ferromagnetic ordering appears at low temperatures. The strongest interactions of coupled ions and antiferromagnetic ordering with T_N=6.5 K were found in $CuSm_2(CCl_3COO)_8 \cdot 6H_2O$ single crystals.Heisenberg model was applied in the calculations for three interacting ions located linearly. The following relation was derived:obtained results.

Słowa kluczowe

(Sm, Nd) trichloroacetates, CuLn2(CCl3COO)8, 6H2O, Eu(III) trichloroacetate, Structure, Magnetism, Spectroscopy

Adres publiczny

https://doi.org/10.1016/j.jallcom.2004.03.056