Pyridine-2,6-dicarboxylate and perchlorate bridged hydrogen bonded 1D chains involving manganese(III)-cyclam moiety: synthesis, X-ray crystal structures and magnetic study.

Autorzy

N. Shaikh

A. Panja

P. Banerjee

Maria Kubiak

Zbigniew Ciunik

Małgorzata Puchalska

Janina Legendziewicz

P. Vojtišek

Rok wydania

2004

Czasopismo

Inorganica Chimica Acta

Numer woluminu

357

Strony

25-32

DOI

10.1016/S0020-1693(03)00380-3

Kolekcja

Naukowa

Język

Angielski

Typ publikacji

Artykuł

Streszczenie

Two compounds H[Mn(cyclam)(pyridine-2,6-dicarboxylate)$_2$] · H_2O (**1**) and [Mn^{III}(cyclam)Cl_2]ClO_4 (**2**) (where cyclam=1,4,8,11-tetraazacyclotetradecane) have been synthesized and structurally characterized. The complex **1** crystallizes in the monoclinic space group *P*2(1)/*c* with *a*=11.4328(11), *b*=14.4275(14), *c*=8.5782(9) Å, *Z*=2, *R*=0.0453. Complex **1** is octahedral in which [Mn(cyclam)]$^{3+}$ unit occupies the basal plane having two pyridine-2,6-dicarboxylate anions in the axial positions. Molecular packing of the crystal is dominated by string of molecules along the *b*-axis. The strings are held together by extensive intermolecular hydrogen bonds involving N–H ⋯ O, N–H ⋯ N and O–H ⋯ O which impart it an infinite 1D chain. Complex **2** on the other hand crystallizes in the space group $P2_12_12_1$ (No. 19) of the orthorhombic system. Mn(III) ions occupy the center of a distorted octahedron and two chloride ions occupy the axial positions. The packing diagram of **2** reveals that the complex is percholrate-bridged hydrogen bonded 1D chain along *a*-axis. Cyclic voltammogram of complex **1** shows a reduction wave at −0.25 V coupled to an oxidation wave at −0.05 V versus SCE in aqueous solution. The complex **2** is characterized by an irreversible reduction wave at −0.11 V versus SCE and is identical to that observed for [Mn^{III}(cyclam)Cl_2]Cl · $5H_2O$. The magnetic measurements in the temperature range 1.9–300 K have been carried out for complex **1** which exhibits a very weak ferromagnetic interaction at low temperature. Complex **2** shows room temperature magnetic moment value of 4.92 BM consistent with the high spin d^4 electronic configuration.Manganese(III)-cyclam moiety has been successfully exploited to prepare two new hydrogen bonded 1D chains, H[Mn(cyclam)(pyridine-2,6-dicarboxylate)$_2$] · H_2O (**1**) and [Mn^{III}(cyclam)Cl_2]ClO_4 (**2**) (where cyclam=1,4,8,11-tetraazacyclotetradecane). Both the compounds were characterized by single crystal X-ray diffraction and spectroscopic measurements. The magnetic measurement in the temperature range 1.9–300 K has been carried out for **1** which exhibits a very weak ferromagnetic interaction at very low temperature.

Słowa kluczowe

Manganese(III) complexes, Hydrogen bonding, 1D chains, Magnetic study

Adres publiczny

https://doi.org/10.1016/S0020-1693(03)00380-3

Strona internetowa wydawcy

http://www.elsevier.com