Magnetic properties and ^{1}H NMR spectroscopy of $TM_2^{2+}[W^{IV}(CN)_8].nH_2O$

J.Kováč[a], M.Bokor[b], M.Zentková[a], A.Zentko[a], Z.Mitróová[a], K.Kamaras[b]

[a]Institute of Experimental Physics, Slovak Academy of Sciences,
Watsonova 47, 043 53 Košice, Slovakia

[b] Research Institute for Solid Physics and Optics, H-1121 Budapest, Hungary

9.7 cm

Possible existence of photoinduced magnetically ordered state in octacyanowolframates with $3d$–ion attracts attention of physicist and chemists. In our paper we report on a detailed study of magnetic properties of bimetallic extended networks built from $W^{IV}(CN)_8{}^{4-}$ and $M^{2+} = Cu^{2+}$, Co^{2+}, Ni^{2+}, Mn^{2+}, Fe^{2+}. Prepared powders were characterized by means of thermogravimetry, UV–VIS, IR spectroscopy and X–ray diffraction. Mn and Fe containing compounds were found to crystallize in tetragonal, while Cu and Ni in orthorombic system. It is well known that W^{IV} is in non–magnetic state with $S = 0$ and therefore magnetic properties of octacyanowolframates are fully determined by weak antiferromagnetic exchange interaction between magnetic $3d$–ions via NC–W^{IV}–CN diamagnetic spacer. The weak exchange interaction is the reason for appearance of magnetically ordered state only at very low temperatures. We have found that susceptibility data follows the Curie Weiss law above $T = 20$ K. Deviations from Curie–Weiss law below 10 K indicate a short range magnetic ordering. In addition, when T decreases $\chi_m T$ value is roughly constant till $T = 10$ K and then decreases. This is another indication of very weak antiferromagnetic interactions at low temperatures. The ^{1}H NMR signals reflect the magnetic moment of the TM ions (μ_P). The decay rates of FID signals increase as μ_P and the applied static *rf* field increase.

13.4 cm

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Corresponding author :
Jozef Kováč

Address for correspondence :
Institute of Experimental Physics SAS
Watsonova 47, 043 53 Košice
Slovakia

Email address :
jkovac@saske.sk