Abstract Submitted
for the MAR07 Meeting of
The American Physical Society

Neutron diffraction and specific-heat studies of magnetic ordering in $[\mathbf{Fe}^{II}(\Delta)\mathbf{Fe}^{II}(\Lambda)(\mathbf{ox})_2(\mathbf{Phen})_2]_n$ molecular magnet C.J. HO, CHIA PIN SUN, C.C. YANG, C.L. HUANG, C.C. CHOU, LU-LIN LI, K.J. LIN, W.H. LI, J.W. LYNN, H.D. YANG, NATIONAL SUN YAT-SEN UNIVERSITY, TAIWAN TEAM, NATIONAL CENTRAL UNIVERSITY, TAIWAN TEAM, NATIONAL CHUNG-HSING UNIVERSITY, TAIWAN TEAM, NIST CENTER FOR NEUTRON RESEARCH, GAITHERSBURG, USA TEAM — The magnetic characteristics of molecular magnet $[\mathrm{Fe}^{II}(\Delta)\mathrm{Fe}^{II}(\Lambda)(\mathrm{ox})_2(\mathrm{Phen})_2]_n$ (**1**), its chemical formula is $C_{28}H_{16}Fe_2N_4O_8$ for unity, has been studied by neutron powder diffraction and field dependence of specific heat and magnetization. The intrinsic antiferromagnetic ordering between magnetic Fe ions and magnetic hysteresis below $T_m \approx$8.6 K are observed by analyzing Bragg pattern of neutron scattering and isothermal magnetization, respectively. The long-range magnetic ordering (LRMO) is also confirmed from the observation of a small λ-type anomaly at T_m in specific heat measurement. However, the magnetic entropy due to this anomaly is estimated as 0.03R, which is much smaller then expected Rln5 (S=2 for Fe^{II}) indicating the spin fluctuations as short-range ordering at $T > T_m$. In addition, another magnetic anomaly located at 1K at zero field is increased in temperature and became broadening when applying magnetic field. It might be explained by quantum spin and Zeeman splitting phenomena.

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Date submitted: 25 Nov 2006 Electronic form version 1.4