

Abstract Submitted  
for the MAR07 Meeting of  
The American Physical Society

**Turning protein into room temperature molecular magnet**<sup>1</sup> CHIA-CHING CHANG, Dept. Bio.Sci.Tech., Natl. Chiao Tung Univ., SHANG-FAN LEE, Inst. Phys., Academia Sinica, KIEN-WEN SUN, Inst.Mol.Sci.Dept Appl.Chem., Natl. Chiao Tung Univ., LOU-SING KAN, Inst. Chem., Academia Sinica — Metallothionein-2 (MT-2) is a cysteine-rich protein that binds seven divalent transition metal ions avidly via its metal-thiol linkages. A magnetic MT-2 containing two Mn and five Cd (Mn,Cd-MT-2) has been synthesized by protein refolding process. No trace of Fe was detected by ICP mass spectroscopy. The uniform size distribution, tested by dynamic light scattering, indicated that each Mn,Cd-MT-2 molecule is a single molecular magnet. Its coercive field of ferromagnetic signals changed slightly from 50 to 300K, but dropped rapidly when the temperature rose from 330 to 395 K. The blocking temperature  $T_B$  is around 410K, in powder form. These results indicated that the un-paired electron of both  $Mn^{2+}$  might be aligned by electron hopping of the bridging sulfurs in the  $\beta$ -metal binding cluster of MT-2 and when the protein deformed at 410K the ferromagnetic signals disappear correspondingly. This engineered molecule exhibits both molecular magnetization and bio-compatibility. These features make Mn,Cd-MT-2, a good candidate for biological applications and sensing sources of new nano-devices.

<sup>1</sup>This study was supported in part by grants NSC 95-2112-M-009-019

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Date submitted: 06 Nov 2006

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