Abstract Submitted
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Magnetic ordering of new molecule-based magnet: [Fe(TCNE)(NCMe)$_2$][FeCl$_4$].[1] KONSTANTIN POKHODNYA, University of Utah/Ohio State University, MICHAEL BONNER, University of Utah, JAE-HYUK HER, PETER W. STEPHENS, Stony Brook University, ARTHUR J. EPSTEIN , Ohio State University, JOEL S. MILLER, University of Utah — The magnetic properties of [Fe(TCNE)(NCMe)$_2$][FeCl$_4$] (TCNE = tetracyanoethylene), a molecule-based magnet synthesized via reaction of FeCl$_2$(NCMe)$_2$ with TCNE in CH_2Cl_2. $M(T)$ is discussed. Both $\chi'(T)$ and $\chi''(T)$, ac susceptibilities are almost frequency independent, and exhibit a sharp peak at ∼90 K in accord with T_c. The zero field cooled (ZFC) and field cooled (FC) magnetic susceptibilities, $\chi_{ZFC}(T)$and $\chi_{FC}(T)$, at 5 Oe rise sharply below 95 K indicative of a magnetic transition. $\chi_{ZFC}(T)$ reaches maximum at 88 K followed by a rapid decrease suggesting an antiferromagnetic(AFM) ground state attributed to AFM coupling between ferrimagnetically ordered [Fe[TCNE](NCMe)$_2$]$^+$ layers. In contrast, $\chi_{FC}(T)$ rises upon further cooling suggesting a strong irreversibility and indicating the presence of a remanant magnetization below 90 K, which increases upon cooling. [Fe(TCNE)(NCMe)$_2$][FeCl$_4$] is the initial member of a new class of magnets. It is the first metal-TCNE magnet with direct bonding between metal ion and [TCNE]$^-$whose structure has been determined, and it possesses a novel planar μ_4-[TCNE]$^-$ spin coupling unit.

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