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Pressure-Induced Ferromagnetic Interactions in the Molecule-based Magnet $Mn(dca)_2$[1] P.A. QUINTERO, M.K. PEPRAH, M.W. MEISEL, Dept. Phys. and NHMFL, Univ. Florida, D. RAJAN, D.R. TALHAM, Dept. Chem., Univ. Florida — Using SQUID magnetometry, we have studied the pressure dependence of the magnetization of the three-dimensional antiferromagnetic coordination polymer $Mn(N(CN)_2)_2$, referred to as $Mn(dca)_2$, up to 1.2 GPa and down to 5 K. The isostructural compounds $M(dca)_2$, where M = Fe, Co, and Ni, have been previously studied by others and are known to show variations in their transition temperatures of up to 26% for pressures as large as 1.7 GPa.[2] Our results on $Mn(dca)_2$ indicate a linear dependence of the transition temperature on the applied pressure, where a change of 48% is measured at 1.2 GPa. In addition, a marked difference in the behavior of the magnetization is observed above and below 0.8 GPa. Specifically, for $P < 0.8$ GPa, the magnetization decreases with increasing pressure, and for $P > 0.8$ GPa, the behavior is inverted. These results indicate that external pressure changes the angle along the Mn-[N(1)-C-N(2)]-Mn superexchange path, thereby favoring ferromagnetic interactions.[3]

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