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Characterization of Novel Double-Chain Metal Monophosphonates as Magnetic Dimers¹ E.S. KNOWLES, D.M. PAJEROWSKI, J.S. XIA, L. YIN, M.W. MEISEL, Dept. Physics and NHMFL, Univ. Florida, L.-M. ZHENG, State Key Lab Coord. Chem., Nanjing Univ., China — The magnetic properties of three isostructural metal monophosphonates, $M\{(2-C_5H_4NO)CH_2PO_3\}(H_2O)_2$ with $M = Co$ (**1**), Ni (**2**), Mn (**3**), were investigated as potential antiferromagnetic spin ladders whose magnetic moment can be tuned by the metal ion. Along with a diamagnetic Cd analog, these compounds possess a double-chain crystal structure where the $M_2(\mu-O)_2$ dimers are bridged by O-P-O chains. The low-field magnetic susceptibilities for compounds **1** and **2** indicate that the systems are non-interacting dimers. During isothermal magnetic field sweeps at temperatures down to 50 mK, a signature associated with the spin-flop transition is observed. On the other hand, compound **3** appears to have a dimer-like superexchange that is similar in strength to three dimensional magnetic interactions present in the material.

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