

High-Pressure Synthesis of *A*-site Ordered Perovskite $\text{PbMn}_3(\text{CrMn}_3)\text{O}_{12}$ with Long-range Antiferromagnetic Ordering and Spin Glass Transition

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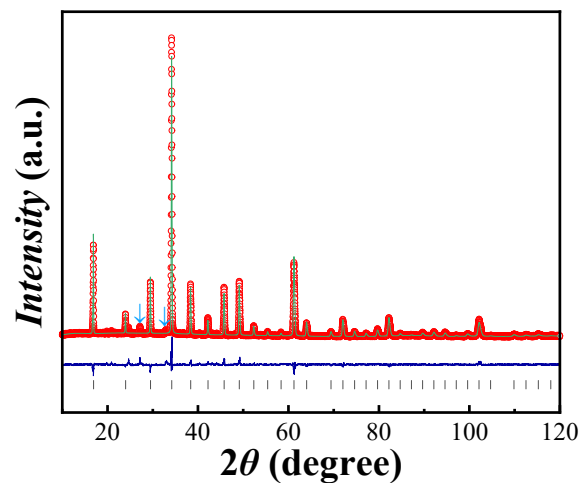


Figure S1. Experimental (open circles), calculated (green line), and difference (blue line) laboratory XRPD patterns of $\text{PbMn}_3\text{CrMn}_3\text{O}_{12}$ at 295 K. The bars show reflection positions for $\text{PbMn}_3\text{CrMn}_3\text{O}_{12}$. Arrows mark the reflections of Mn_2O_3 impurity.

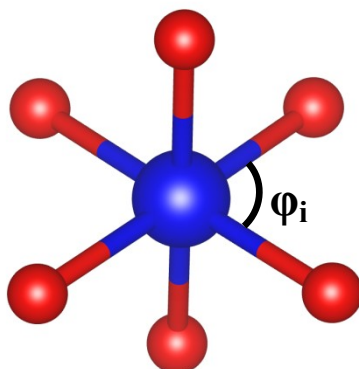


Figure S2. Schema of the cis ligand-metal-ligand angles φ_i , which is the parameter to

calculate the angle distortion following the formula $\Sigma = \sum_{i=1}^{12} |\varphi_i - 90|$. The higher value Σ indicates the stronger distortion of polyhedron ¹.

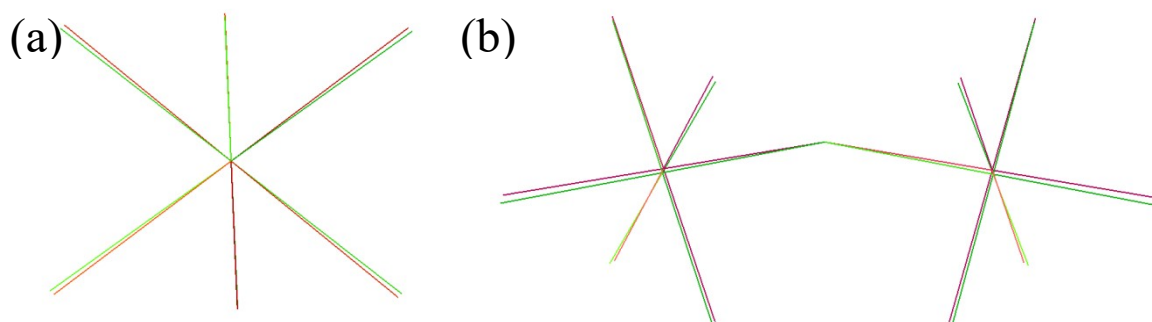


Figure S3. Structural overlay of Mn/CrO_6 and $(\text{Mn/Cr})_2\text{O}_{11}$ in $\text{PbMn}_3\text{CrMn}_3\text{O}_{12}$ (green line) and $\text{PbMn}_3\text{Mn}_1\text{Cr}_3\text{O}_{12}$ (red line) at 300 K.

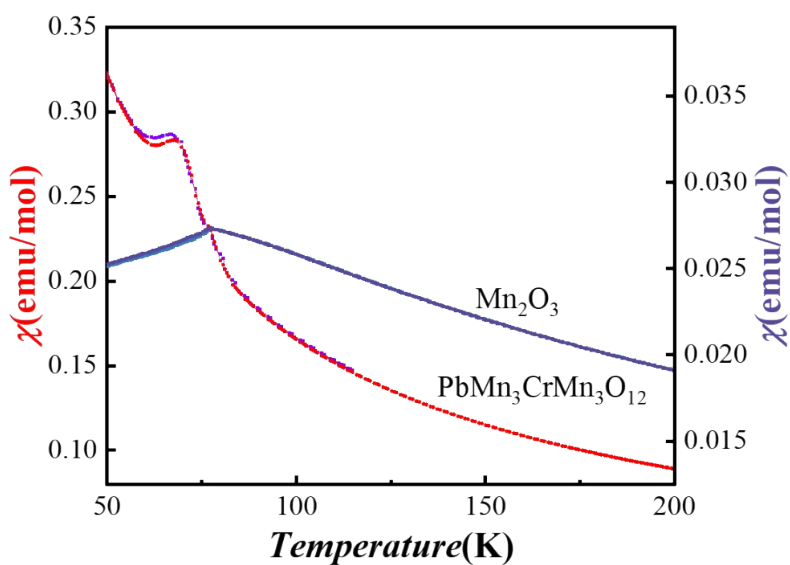


Figure S4. The compared magnetic susceptibilities of $\text{PbMn}_3\text{CrMn}_3\text{O}_{12}$ and Mn_2O_3 , showing the anomaly around 80 K resulted from the impurity Mn_2O_3 .

Reference

- 1 R. Ketkaew, Y. Tantirungrotechai, P. Harding, G. Chastanet, P. Guionneau, M. Marchivie, and D. J. Harding. *Dalton Trans.*, 2021, **50**, 1086-1096.