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Structural and magnetic properties of A-site ordered manganites $RBaMn_2O_6$ (R=Pr, Nd, $Pr_{1/2}Nd_{1/2}$) YANG REN, H. CHURCHILL, XFD, Argonne National Laboratory, Argonne, IL 60439, B. DABROWSKI, J. MAIS, S. KOLESNIK, O. CHMAISSEM, Dept. of Phys., Northern Illinois Univ., DeKalb, IL 60115 — Temperature and magnetic-field dependent structural and physical properties of A-site ordered manganites $RBaMn_2O_6$ (R = Pr, Nd, $Pr_{1/2}Nd_{1/2}$) were studied using high-resolution high-energy X-ray powder diffraction and magnetic and transport measurements. The ferromagnetic (FM) to antiferromagnetic (AF) phase transitions of all three materials are accompanied by first-order structural changes. Both the FM and AF phases of $PrBaMn_2O_6$ and $Pr_{1/2}Nd_{1/2}BaMn_2O_6$ have tetragonal structures, though the FM phase of the latter shows significant broadening of the (200) peak, suggesting a slight in-plane orthorhombic distortion. $NdBaMn_2O_6$ is tetragonal in the AF phase and orthorhombic in the FM phase. The FM-AF transition temperature T_c increases with decreasing R^{3+} ionic radius, while decreases with applied magnetic fields. The T_c can be shifted by 15$\sim$25 K for H=6 T. Use of the Advanced Photon Source was supported by the U. S. Department of Energy, Office of Science, Office of Basic Energy Sciences, under Contract No. W-31-109-Eng-38 and work at NIU by NSF- DMR-0302617.

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