

Abstract Submitted  
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**Ferromagnetism in perovskites  $\text{Sr}_{1-x}\text{Pb}_x\text{RuO}_3$  ( $0 \leq x \leq 1$ )** J.-G. CHENG, J.-S. ZHOU, J.B. GOODENOUGH, TMI, University of Texas at Austin, Y. REN, Y.J. FENG, APS, Argonne National Lab — Orthorhombic  $\text{SrRuO}_3$  is a well-known metallic ferromagnet with  $T_c \approx 165$  K.<sup>1</sup> We have demonstrated that a complete solid solution of the orthorhombic perovskites  $\text{Sr}_{1-x}\text{Pb}_x\text{RuO}_3$  can be made with high-pressure synthesis. Whereas the ground state for the whole series remains metallic, the Pb substitution reduces the Curie temperature and eventually ferromagnetic phase is totally suppressed at  $x \approx 0.5$ . Moreover, an unusual low-temperature phase with the  $\text{Imma}$  space group is developed through a first-order transition below  $T_t \approx 90$  K in the orthorhombic  $\text{PbRuO}_3$ . Based on physical properties measurements on a small grain of the high-pressure product  $\text{PbRuO}_3$ , we have shown that the transition at  $T_t$  is a metal-metal transition.  $T_t$  is suppressed below 10 K under high pressure 3GPa as verified by the structural study with a diamond anvil cell with synchrotron radiation. Suppression of ferromagnetism in this system can be attributed to the hybridization of the  $\text{Pb}^{2+}$  6s electrons with the Ru 4d electrons that broadens the Ru 4d band. <sup>1</sup> G. Cao, et al., Phys. Rev. B **56**, 321 (1997). <sup>2</sup>S. A. J. Kimber, et al., Phys. Rev. Lett. **102**, 046409 (2009). <sup>3</sup>J.-G. Cheng, et al., Phys. Rev. B, in press.

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