

Abstract Submitted  
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**Neutron Diffraction Studies of PrFe(1-x)Ru(x)AsO<sup>1</sup>** YUEN YIU, Univ of Tenn, OVIDIU GARLEA, ASHFIA HUQ, Oak Ridge Natl Lab, MICHAEL MCGUIRE, Oak Ridge National Laboratory, DAVID MANDRUS, Univ of Tenn, Oak Ridge Natl Lab, STEPHEN NAGLER, Oak Ridge Natl Lab — We report neutron powder diffraction (NPD) studies of Ru doped PrFe(1-x)Ru(x)AsO. The parent compound PrFeAsO undergoes a structural transition as well as magnetic transitions involving Fe and Pr moments upon cooling. Previous measurements (M. A. McGuire et al, Jnl of Solid State Chem, 182- 8, 2326-2331) showed that Ru doping suppresses the above transitions. However, unlike most 1111's, this does not lead to superconductivity. To investigate the origin of this odd behavior we performed NPD measurements as a function of temperature for values of x up to 0.75. The results showed that although the structural and magnetic transitions are suppressed, the c axis displayed apparent negative thermal expansion (NTE) for all values of x. Such NTE has been seen in the parent compound (S. A. J. Kimber et al, PRB 78-140503), but to our knowledge there are no reports of NTE in superconducting samples. This suggests that the mechanism producing the NTE could also be responsible for the absence of superconductivity. We also report data on the magnetic transitions for lightly doped samples with x up to 0.1.

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Yuen Yiu  
Univ of Tenn

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