

Abstract Submitted  
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**Non-stoichiometry and Defects in the Weyl Semimetals TaAs, TaP, NbAs, and NbP**<sup>1</sup> TIGLET BESARA, DANIEL A. RHODES, KUAN-WEN CHEN, QUI ZHANG, BIN ZHENG, YAN XIN, LUIS BALICAS, RYAN E. BAUMBACH, THEO SIEGRIST, National High Magnetic Field Laboratory / Florida State University — We report on a structural study of the Weyl semimetals TaAs, TaP, NbAs, and NbP, utilizing diffraction techniques (single crystal x-ray diffraction and energy dispersive spectroscopy) and imaging techniques (transmission electron microscopy). We observe defects of various degrees, leading to non-stoichiometric single crystals of all four semimetals. While TaP displays a very large pnictide deficiency with composition TaP<sub>0.83(3)</sub> and stacking faults accompanied by anti-site disorder and site vacancies, TaAs displays transition metal deficiency with composition Ta<sub>0.92(2)</sub>As and a high density of stacking faults. NbP also displays pnictide deficiency, yielding composition NbP<sub>0.95(2)</sub>, and lastly, NbAs display very little deviation from a 1:1 composition, NbAs<sub>1.00(3)</sub>, and is therefore recommended to serve as the model compound for these semimetals.

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