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Magnetic structure and site occupancies in Fe containing μ-phases AFe (A=Ta, Nb, Mo)[1] NIRMAL GHIMIRE, University of Tennessee, OVIDIU GARLEA, MICHAEL MCGUIRE, Oak Ridge National Laboratory, DAVID MANDRUS, University of Tennessee and Oak Ridge National Laboratory — Binary mu-phases are intermetallic compounds occurring in numerous systems combining heavy and light transition metals. They have compositions close to AM where A is a 4d or 5d element (Nb, Ta, Mo, W) and M is a 3d element (Fe, Co, Ni, Zn). The possibility of mixed site occupancies results in stoichiometries ranging from A_7M_6 to A_6M_7. Interestingly, only the Fe containing compounds have been found to show magnetic ordering. NbFe and TaFe are known to be antiferromagnetic, with Neel temperatures near 280 and 320 K, respectively. It has been reported that in these materials ferromagnetic kagome planes stacked antiferromagnetically along the rhombohedral (111) direction, but the exact site occupancies in these layers remain unclear. In our investigation we have found mu-phase of MoFe also to be antiferromagnetic, but with a unique magnetic structure and significantly lower transition temperature about 110 K. Here we discuss in detail the crystallographic and magnetic structures of TaFe, NbFe and MoFe mu-phases based on our recent neutron diffraction studies and physical property measurements on polycrystalline samples.

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