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Physical properties of Kx(Ni,Fe)2-ySe2 single crystal alloys1 HYEJIN RYU, HECHANG LEI, KEFENG WANG, Brookhaven National Lab., D. GRAF, National High Magnetic Field Lab., EMIL S. BOZIN, J. B. WARREN, C. PETROVIC, Brookhaven National Lab. — We report physical properties and ground state phase diagram of Kx(Fe,Ni)2-ySe2 single crystal alloy series. The ground state evolves from a heavy-Fermion-like metal KxNi2-ySe2 (I4/mmm) to a phase separated superconducting KxFe2-ySe2 (I4/m and I4/mmm space groups). Intermediate alloys show rich variety of ground states including semiconducting magnetic spin glass as Ni is replaced by Fe. We will address magnetic, thermodynamic, electronic and thermal transport properties and their connection to relevant structural parameters. 1Work at Brookhaven is supported by the U.S. DOE under Contract No. DE-AC02-98CH10886 and in part by the Center for Emergent Superconductivity, an Energy Frontier Research Center funded by the U.S. DOE, Office for Basic Energy Science (H. L. and C. P). Work at the National High Magnetic Field Laboratory is supported by the DOE NNSA DEFG52-10NA29659 (D.G.), by the NSF Cooperative Agreement No. DMR-0654118, and by the state of Florida.

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