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Oxidative deintercalation of single crystal $Na_{1-\delta}FeAs$ upon Interaction with the environment NICHOLAS SPYRISON, M.A. TANATAR, K. CHO, E. BLOMBERG, The Ames Laboratory, Ames, IA, G. TAN, J. YAN, P. DAI, C. ZHANG, Oak Ridge National Laboratory, Knoxville, TN, R. PROZOROV, The Ames Laboratory, Ames, IA — Due to high mobility of Na ions, NaFeAs superconductor exhibits pronounced reaction with the environment, leading to a bulk change change in stoichiometry. We study the doping evolution of the same single crystals as a function of time of the environmental exposure. In NaFeAs, a controlled reaction with air increases the superconducting transition temperature, T_c, from the initial value of 12 K to 27 K as probed by transport and magnetic measurements. Temperature dependent resistivity, ρ_a(T), shows a dramatic change with the exposure time. In freshly prepared samples, ρ_a(T) reveals clear features at the structural, $T_s \approx 60$ K, and magnetic, T_m=45 K, transitions and superconductivity with onset $T_{c;ons} \approx$16 K and offset $T_{c;off} \approx$12 K. The exposed samples show $T-$linear variation of ρ_a(T) above $T_{c;ons} \approx$30 K ($T_{c;off} \approx$26 K). This suggests bulk doping and implies the existence of a quantum critical point at the optimal doping. The resistivity for different doping levels is affected below $\sim$ 200 K suggesting the existence of a characteristic energy scale that caps the $T-$linear regime, which could be identified with a pseudogap.

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