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Effect of doping on the crystalline structure and superconductivity properties in $Ca_{1-x}Na_xFe_2As_2$ single crystals[1] LEONARDO CIVALE, NESTOR HABERKORN, BORIS MAIOROV, MARCELO JAIME, Los Alamos National Laboratory, Los Alamos, NM, USA, G. CHEN, W. YU, Renmin University of China, Beijing, China — We have studied the crystalline structure and the superconducting properties of $Ca_{1-x}Na_xFe_2As_2$ single crystals for various levels of the chemical doping (x). We performed a comparative analysis of the angular dependent $H_{c2}(\Theta)$ (where Θ is the angle between the magnetic field and the c axis) for x$\sim$0.5 and x $\sim$ 0.75, corresponding to $T_c \sim$ 19 K and 33 K, respectively. We found that in both cases $H_{c2}(\Theta)$ near T_c exhibits a single band character with the same anisotropy $\gamma \sim$ 1.8. In the crystal with $T_c \sim$ 33 K we detected the presence of a narrow vortex-liquid phase, in agreement with the expectation from estimates based on the Lindemann criterion and the Ginzburg number. We also found large and anisotropic flux creep rates, with temperature dependences that indicate glassy relaxation. We analyzed those results in terms of single vortex and collective pinning regimes associated with random and correlated disorder.

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