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Upper critical field study of a LiFeAs single crystal grown by Sn flux SEUNGHYUN KHIM, BUMSUNG LEE, JAE WOOK KIM, Seoul National University, EUN SANG CHOI, Florida State University, G. R. STEWART, University of Florida, KEE HOON KIM, Seoul National University, SEOUL NATIONAL UNIVERSITY TEAM, FLORIDA STATE UNIVERSITY COLLABORATION, UNIVERSITY OF FLORIDA COLLABORATION — Temperature dependence of the upper critical fields $H_{c2}(T)$ was investigated in a LiFeAs single crystal by measuring resistivity at a fixed magnetic field up to 36 T. $H_{c2}^{ab}(0)$ and $H_{c2}^c(0)$ values are obtained as 30 and 17.2 T respectively. $H_{c2}^{ab}(0)$ is lower than expected one from the orbital limiting field $H_{c2}^{orb}(0)$ because of the presence of a moderate Pauli limiting effect; upon fitting $H_{c2}^{ab}(T)$ with the WHH formula, the Maki parameter $\alpha = 0.65$. For $H_{c2}^c(T)$, rather a linearly increasing behavior of $H_{c2}(T)$ could be explained by a two-band model in a dirty limit. The anisotropy $H_{c2}^{ab}/H_{c2}^c(T)$ is ~ 2.3 near T_c and decreases with temperature being lowered to reaches ~ 1.3 at $T = 0$. We also compare $H_{c2}(T)$ of this 111 system with those of other Fe-based superconductors and conclude that the moderateness of the spin-paramagnetic effect is related with rather a weak slope of $H_{c2}(T)$ near T_c , which is inversely proportional to the Fermi velocity and mean free path. Thus, the comparison of the slope of H_{c2} supports that LiFeAs is located in a rather clean limit among the Fe-based superconductors.

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