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Upper critical field of $LnO_{0.5}F_{0.5}BiS_2$ ($Ln = La, Nd$) superconductors at extreme conditions¹ YUANKAN FANG, C. T. WOLOWIEC, A. J. BREINDEL, D. YAZICI, M. B. MAPLE, Univ of California - San Diego, P.-C. HO, California State Univ-Fresno — One of the most interesting phenomena displayed by many BiS₂-based superconductors including $LnO_{1-x}F_xBiS_2$ ($Ln = La-Nd$) is the rather abrupt enhancement of superconducting transition temperature (T_c) under high pressure (HP). In this study, we investigated the upper critical field H_{c2} of polycrystalline samples of $LnO_{0.5}F_{0.5}BiS_2$ ($Ln = La, Nd$) at ambient pressure and high pressure at various magnetic fields up to 8.5 T. For the $LaO_{0.5}F_{0.5}BiS_2$ sample under HP H_{c2} shows an anomalous behavior between 5 and 6 T. However, such anomalous behavior is very subtle for $NdO_{0.5}F_{0.5}BiS_2$ under HP. The results explain why the pressure-induced enhancement of T_c for $NdO_{0.5}F_{0.5}BiS_2$ is not as large as that for $LaO_{0.5}F_{0.5}BiS_2$ and also support the idea that local atomic environment, is possibly more essential to the enhancement of T_c for BiS₂-based superconductors than the structural phase transition.

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