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Huge Critical Current Density and Tailored Superconducting Anisotropy in SmFeAsO(0.8)F(0.15) by Low Density Columnar-Defect Incorporation U. WELP, Argonne National Laboratory, L. FANG, Y. JIA, V. MISHRA, C. CHAPARRO, V.K. VLASKO-VLASOV, A.E. KOSHELEV, G.W. CRABTREE, S.F. ZHU, Argonne National Laboratory, USA, N.D. ZHIGADLO, ETH Zuerich, Switzerland, S. KATRYCH, J. KARPINSKI, ETH Zuerich & EPFL Lausanne, Switzerland, W.K. KWOK, Argonne National Laboratory, USA — SmFeAsO(0.8)F(0.15) is of great interest because it has the highest transition temperature of all the iron-based superconductors. We find that the introduction of a low density of correlated nano-scale defects enhances the critical current density up to 2 $\times$ 10^7A/cm^2 at 5 K without any suppression in the high superconducting transition temperature of 50 K and amounting to 20 % of the theoretical depairing current density. We also observed a surprising reduction in the thermodynamic superconducting anisotropy from 8 to 4 upon irradiation. A model based on anisotropic electron scattering predicts that the superconducting anisotropy can be tailored via correlated defects in semi-metallic, fully gapped type II superconductors. - We acknowledge support by the Center for Emergent Superconductivity, an EFRC funded by the US DOE, Office of Basic Energy Sciences (LF, YJ, VM, AEK, WKK, GWC), by the DOE, Office of Basic Energy Sciences, under Contract No. DE-AC02-06CH11357 (CC, VKV, UW), by the EC Research Council project SuperIron (JK, SK), and by the Swiss National Science Foundation and the National Center of Competence in Research MaNEP (NDZ).

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