

Abstract Submitted
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Doubling the Critical Current Density of 2G-Coated Conductors through Proton Irradiation MAXIME LEROUX, Y. JIA, D.J. MILLER, J.G. WEN, W.K. KWOK, U. WELP, Argonne Natl Lab, M. RUPICH, S. FLESHLER, A. MALOZEMOFF, American Superconductor Corp., A. KAYANI, Western Michigan University, O. AYALA-VALENZUELA, L. CIVALE, Los Alamos National Laboratory — The in-field performance of production-line 2nd generation high temperature superconducting cable can be substantially improved by post-fabrication irradiation with 4 MeV protons. A dose of $8.10^{16}p/cm^2$ nearly doubles the critical current in fields of 6 T // c at 27 K and more generally the suppression of J_c in magnetic field is reduced. A mixed pinning landscape composed of preexisting precipitates and twin boundaries and small, finely dispersed irradiation induced defects may account for the improved vortex pinning in high magnetic fields. Our current data-set indicates that there is significant head-room for further enhancements. This work was supported by the Center for Emergent Superconductivity, an Energy Frontier Research Center funded by the U.S. Department of Energy, Office of Science, Office of Basic Energy Sciences (Y.J., M.L., W.K.K., U.W., O.A.V., L.C.) and by the Department of Energy, Office of Basic Energy Sciences, under Contract No. DE-AC02-06CH11357 (D.J.M., J.G.W.). Irradiations were carried out at the Western Michigan University accelerator laboratory. Microstructure was characterized in the Electron Microscopy Center at Argonne, supported by the Office of Science-Basic Energy Science.

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