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Enhanced critical currents of commercial 2G superconducting coated conductors through proton irradiation ULRICH WELP, M. LEROUX, K.J. KIHLSTROM, W.-K. KWOK, A.E. KOSHELEV, D.J. MILLER, Argonne National Laboratory, M.W. RUPICH, S. FLESHLER, A.P. MALOZEMOFF, American Superconductor Corp., A. KAYANI, Western Michigan University — We report on magnetization and transport measurements of the critical current density, Jc, of commercial 2G YBCO coated conductors before and after proton irradiation. The samples were irradiated along the c-axis with 4 MeV protons. Proton irradiation produces a mixed pinning landscape composed of pre-existing rare earth particles and a uniform distribution of irradiation induced nm-sized defects. This pinning landscape strongly reduces the suppression of Jc in magnetic fields resulting in a doubling of Jc in a field of $\sim$ 4T. The irradiation dose-dependence of Jc is characterized by a temperature and field dependent sweat spot that at 5 K and 6 T occurs around $20\text{x}10^{16}$ p/cm^2. Large-scale time dependent Ginzburg-Landau simulations yield a good description of our results. This work supported by the Center for Emergent Superconductivity, an Energy Frontier Research Center funded by the U.S. D.O.E., Office of Science, Office of Basic Energy Sciences (KK, ML, AEK) and by the D.O.E, Office of Basic Energy Sciences, under Contract No. DE-AC02-06CH11357 (UW, WKK).

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