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Effect of electron irradiation on superconductivity in isovalently substituted $\mathbf{Ba(Fe_{1-x}Ru_x)_2As_2}$ RUSLAN PROZOROV, M.A. TANATAR, A. THALER, S.L. BUD'KO, P.C. CANFIELD, The Ames Laboratory, Ames, IA 50011, USA, M. KONCZYKOWSKI, LSI, Ecole Polytechnique, Palaiseau, France, T. SHIBAUCHI, Dept. of Physics, Kyoto Univ., Kyoto, Japan — Single crystals of isovalently substituted $Ba(Fe_{1-x}Ru_x)_2As_2$ were irradiated at 23 K by 2.5 MeV electrons with a total fluence up to 2×10^{19} electrons per cm^2. The resistance was measured both in situ at 23 K during irradiation, and as a function of temperature in a separate set-up, between the irradiation runs while the sample warmed to room temperature. We found that $\Delta\rho_0/\rho_0 \approx 0.2$ change in the residual resistivity, reached at the maximum irradiation dose, led to about a $\Delta T_c/T_{c0} \approx 0.35$ decrease of T_c. This trend is universal in samples of different doping levels with different initial T_{c0}. The in-situ measurements also allowed us to understand the effects of room temperature annealing on the point-like defects induced by irradiation. The annealing results in a decrease of about a 20% of the total increase in resistance achieved due to irradiation. However, residual 80% remain stable at least one month after irradiation. We compare our results with theoretical predictions for different pairing scenarios, including extended $s_\pm$. Work in Ames was supported by the Department of Energy Office of Science, Basic Energy Sciences under Contract No. DE-AC02-O7CH11358.

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