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Effect of electron irradiation on $(Ba_{1-x}K_x)Fe_2As_2$ from London penetration depth measurements KYUIL CHO, S. TEKNOWIJOYO, M. A. TANATAR, Y. LIU, T. A. LOGRASSO, R. PROZOROV, Ames Laboratory and Iowa State University, USA, M. KONCZYKOWSKI, Ecole Polytechnique, France, S. MAITI, P. HIRSCHFELD, University of Florida, USA, V. MISHRA, Oak Ridge National Laboratory, USA — The effects of artificial disorder induced by 2.5 MeV electron irradiation on superconducting properties of single crystals of $(Ba_{1-x}K_x)Fe_2As_2$ (fifteen different compositions covering a wide interval of $0.20 \leq x \leq 1.0$) was systematically studied by tunnel-diode resonator measurements of the in-plane London penetration depth, $\lambda(T)$, down to 50 mK before and after irradiation. Upon electron irradiation (with total doses up to 2×10^{19} e^-/cm^2), the increase of resistivity at T_c, $\Delta\rho(T = T_c)$ and the decrease of $\Delta T_c/T_{c0}$ was largest at heavily over-doped compositions. A non-exponential behavior in samples with $x \geq 0.8$ was found from the low-temperature variation of $\lambda(T)$ suggesting a change in the superconducting gap structure or peculiarities of (inter-, intra-) band scattering and pairing. We will discuss possible scenarios to connect a fully gapped state at the optimal doping ($x \approx 0.40$) with the apparent nodal behavior in the heavily over-doped region ($x \geq 0.8$).

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