Effect of electron irradiation on resistivity and London penetration depth of (Ba$_{1-x}$K$_x$)Fe$_2$As$_2$ $^1$ KYUIL CHO, J. MURPHY, H. KIM, M.A. TANATAR, R. PROZOROV, The Ames Laboratory, USA, M. KONCZYKOWSKI, LSI, Ecole Polytechnique, France, B. SHEN, H.H. WEN, Nanjing University, China — The effect of electron irradiation on the in-plane resistivity and London penetration depth was studied in single crystals of (Ba$_{1-x}$K$_x$)Fe$_2$As$_2$ (x = 0.19, 0.24, and 0.34). The irradiation fluence varied between $8.7 \times 10^{18}$ and $5.2 \times 10^{19}$ electrons per cm$^2$. We found a profound decrease of the critical temperature, $T_c$, by 3 - 10 K depending on doping and the irradiation dose. Expectedly, the residual resistivity increases. The analysis of low-temperature part of London penetration depth shows that the superconducting gap becomes more anisotropic in under-doped (x = 0.19 and 0.24) crystals. Interestingly, however, the full gap at the optimal doping (x = 0.34) remained at the same $\Delta(0)/T_c$ ratio after $5.2 \times 10^{19}$ e/cm$^2$ irradiation even though $T_c$ has decreased by almost 10 K (1/4 of the original value). The results will be discussed in a framework of $s_\pm$ pairing with a complex interplay between intra- and inter-band interactions and scattering.

$^1$This work was supported by the Department of Energy Office of Science, Basic Energy Sciences under Contract No. DE-AC02-07CH11358.