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Suppression of critical temperature in proton irradiated $\mathbf{Ba(Fe_{1-x}Co_x)_2As_2}$ YASUYUKI NAKAJIMA, University of Tokyo, JST- TRIP, TOSHIHIRO TAEN, YUJI TSUCHIYA, University of Tokyo, TSUYOSHI TAMEGAI, University of Tokyo, JST- TRIP, HISASHI KITAMURA, TAKESHI MURAKAMI, NIRS — The study on the superconducting gap structure of iorn-pnictide superconductor is one of the most important issues to uncover the pairing mechanism of high temperature superconductivity. To elucidate the superconducting gap structure, a detailed study on the effect of defects is very crucial because the pair-breaking effects due to scattering centers are phase-sensitive. We report the suppression of T_c due to the pair- breaking effect introduced by 3 MeV proton irradiation in $Ba(Fe_{1-x}Co_x)_2As_2$ single crystals at under-, optimal-, and over-doping levels. We find that T_c decreases and residual resistivity increases monotonically with increasing the proton dose. We also find no resistive upturn at low temperatures, which suggests that the proton irradiation provides nonmagnetic scattering centers. The critical scattering rate for all samples estimated by three different ways is much higher than that expected in $s_{\pm}$-pairing scenario based on inter-band scattering due to antiferro-magnetic spin fluctuations.

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