Effect of Electron Irradiation on isovalenly substituted SrFe$_2$(As$_{1-x}$P$_x$)$_2$, $x = 0.35$ C.P. STREHLOW, Ames Laboratory, Ames, IA, USA, JASON MURPHY, Hummingbird Scientific, Lacey, WA, MAKARIY TANATAR, RUSLAN PROZOROV, Ames Laboratory, Ames, IA, USA, M. KONCZYKOWSKI, LSI, Ecole Polytechnique, Palaiseau, France, N. SALOVIICH, R.W. GIANNETTA, UIUC, Urbana, IL, T. KOBAYASHI, S. MIYASAKA, S. TAJIMA, Osaka University, Osaka, Japan — The effects of electron irradiation on the temperature-dependent London penetration depth, $\lambda(T)$, have been investigated in annealed optimally doped single crystals of isovalently substituted SrFe$_2$(As$_{1-x}$P$_x$)$_2$, $x = 0.35$, using the tunnel diode resonator technique. The low temperature behavior of $\lambda(T)$ changes under electron irradiation from almost $T$–linear to practically exponentially saturated behavior, similar to the observations in another isovalently substituted 122 pnictide, BaFe$_2$(As$_{1-x}$P$_x$)$_2$. Furthermore, aluminum-coating technique was used to measure the absolute values of the London penetration depth, $\lambda(0)$, which allowed calculations of the superfluid density, $\rho_s$. We conclude that, similar to BaFe$_2$(As$_{1-x}$P$_x$)$_2$, the superconducting properties of SrFe$_2$(As$_{1-x}$P$_x$)$_2$ are compatible with $s_{\pm}$ pairing with accidental line nodes that are lifted by pair-breaking disorder. This work was supported by the Department of Energy Office of Science, Basic Energy Sciences under Contract No. DE-AC02-07CH11358.

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Date submitted: 14 Nov 2013