Evolution of superconductivity in SrFe$_2$As$_2$ with Ni and Pt substitution

S.R. SAHA, T. DRYE, K. KIRSHENBAUM, N.P. BUTCH, X. ZHANG, R. GREENE, J. PAGLIONE, Center for Nano Physics and Advanced Materials, Department of Physics, University of Maryland — The superconducting state in the iron pnictide compounds with tetragonal ThCr$_2$Si$_2$ crystal structure has attracted much interest. Transition metal substitution is known to suppress the antiferromagnetic phase of the parent compounds, yielding superconductivity with maximum $T_c$ values approaching \( \sim 20-25 \) K when Co, Ni, Ru, Rh, Pd, or Ir are used to replace Fe. However, this trend is known to be broken in the case of SrFe$_{2-x}$Ni$_x$As$_2$ and SrFe$_{2-x}$Pd$_x$As$_2$, which both exhibit reduced maximum $T_c$ values of order 10 K. We will present the effects of Ni and Pt substitution in single crystalline SrFe$_2$As$_2$ as measured by resistivity, magnetic susceptibility and specific heat, and discuss how our results relate to the isoelectronic case of Pd substitution as well as other neighboring transition metal substitution series.