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T_c suppression in NdFeAs(OF) single crystal by Kondo-like scattering induced by α-particle irradiation M. PUTTI, CNR-INFM-LAMIA, Department of Physics, University of Genova, Genova, Italy, C. TARANTINI, A. GUREVICH, D.C. LARBALESTIER, Applied Superconductivity Center, National High Magnetic Field Laboratory, FSU, Tallahassee, FL, USA, Y. SHEN, R.K. SINGH, J.M. ROWELL, N. NEWMAN, Department of Materials Science and Engineering, ASU, Tempe, AZ, USA, P. CHENG, Y. JIA, H.H. WEN, Institute of Physics, National Laboratory of Condensed Matter Physics, Beijing, China —
We investigated the suppression of T_c in a thin NdFeAs(OF) single crystal by uniform disorder induced by irradiation with 2MeV α-particles with the fluence up to $5.25\times10^{16}\mathrm{cm}^{-2}$. Our results indicate that irradiation defects produce both nonmagnetic and magnetic scattering, resulting in a significant Kondo-like excess resistance $\Delta\rho(\mathrm{T}) \propto lnT$ above T_c over 2 decades in T. Despite very high densities of irradiation defects, the dose at which T_c is suppressed to zero is far larger than that required for cuprates and similar to that found for the s-wave two-band superconductor MgB_2. The observed resilience of multiband superconductivity in pnictides to strong magnetic and nonmagnetic disorder presents a challenge to the existing theories.

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