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Transport properties of $FeTe_{0.65}Se_{0.35}$ crystals doped with Ni and Cu impurity

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In this work we present the results of the transport measurements carried out on single crystals of $FeTe_{1-x}Se_x$ with x =0.35, doped with Ni and Cu impurity. The crystals, with the impurity content up to 20 at. %, have been grown using Bridgman's method. The resistivity measurements, carried out in zero magnetic field in the temperatures between 2 K and 300 K, show that superconductivity disappears above 2.8 at. % of Ni, and the dependence of the superconducting transition temperature on the impurity content is close to linear. Doping affects strongly the T-dependence of the resistivity, inducing low-T upturn, and leading eventually to the semiconducting-like behavior. The results for Cu-doped crystals are more complicated to interpret; it appears that impurity distribution may be inhomogeneous in this case. We also present the results of the magnetoresistance measurements in magnetic fields from 0 to 14 Tesla. Using these data we evaluate the doping effect on the basic superconducting and normal-state parameters, such as upper critical field, coherence length, and the mean-free path.

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