The effect of Ni and Fe doping on Hall anomaly in vortex state of doped YBCO samples

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Abstract
We have investigated hall effect on YBa$_2$Cu$_{3-x}$M$_x$O$_{7-\delta}$ ($M=\text{Ni, Fe}$) bulk samples, with dopant amount $0 \leq x \leq 0.045$ for Ni and $0 \leq x \leq 0.03$ for Fe, with magnetic field ($H=2.52, 4.61, 6.27$ kOe) perpendicular to sample’s surface with constant current $100$ mA. Our study shows that as both dopants increases, $T_C$ decreases and it decreases faster by Ni. In these ranges of dopant and magnetic field the Hall sign reversal has been observed in all samples once and also $\Delta_{\text{max}}$ has occurred in lower temperatures, its magnitude increases by Ni and in Fe doped samples except in sample with dopant amount $x=0.03$, which almost decreases, that it can show effect of magnetic doping on hall effect.

Keywords: Y based superconductors, Hall anomaly sign reversal, vortex state

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