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Isotropic critical currents in anisotropic superconductors: a simple physical model[1] D.K. CHRISTEN, Y.L. ZUEV, S. WEE, A. GOYAL, S.W. COOK, Oak Ridge National Laboratory — Critical current densities, J_c, that are nearly independent of magnetic field orientation can be observed in intrinsically anisotropic high-temperature superconductors that have specific, very strong flux pinning nanostructure. The phenomenon is observed to occur at specific temperature dependent fields, $H^*(T)$. The possibility of such isotropic behavior can be described by a simple physical model based on the orientation dependence of the irreversibility field $H_{irr}(\theta)$ and the power-law decay exponent $\alpha(\theta)$, where $J_c \propto H^{-\alpha}$ in the intermediate field regime. An analysis will be discussed that elucidates necessary conditions for occurrence of the effect, and provides possible predictive tools for tailoring of $H^*(T)$ to practical fields and temperatures by means of defect engineering.

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