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Complex vortex pinning landscape in YBCO: temperature- and orientation-dependent J_c studies J.W. SINCLAIR, University of Tennessee, J.R. THOMPSON, University of Tennessee and Oak Ridge National Laboratory, D.K. CHRISTEN, Y. ZHANG, Y.L. ZUEV, C. CANTONI, Oak Ridge National Laboratory, YIMIN CHEN, V. SELVAMANICKAM, SuperPower, Inc. — Studying the temperature and field-orientation dependence of critical current density J_c gives insight into vortex pinning. The orientation dependence of J_c in $YBa_2Cu_3O_{\sim 7}$, containing both correlated disorder and localized 'isotropic' defects, was determined at temperatures $T = 77$ K to 5 K in magnetic fields up to $\mu_0 H = 6$ T. The inductive measurements ensured very low dissipation levels, with electric fields $E \sim 10^{-10}$ V/cm in the highly textured YBCO thin layers. The study revealed systematic changes in the orientation dependent J_c. At high temperatures, J_c exhibited a *peak* for **H** || c-axis; with decreasing T, the J_c became almost independent of angle and at still lower temperatures, it exhibited a *minimum* for **H** || c-axis. These findings are interpreted in terms of a competition between different types of pinning sites in a complicated pinning landscape. Research at ORNL sponsored by Div. Materials Sciences and Engineering, USDOE.

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