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Strong Reduction of T_cSuppression by Magnetic Field in $YBa_2Cu_3O_{7+x}$ Films with Dispersed Nanoparticles E. CIMPOIASU, J. D. FELDMANN, U. S. Naval Academy, C. V. VARANASI, T. J. HAUGAN, P. N. BARNES, G. A. LEVIN, Air Force Research Laboratory — Improvements in the critical current density J_c in applied magnetic fields are of great importance for applications of the $YBa_2Cu_3O_{7-x}$ coated conductors. Nanosize inclusions have shown to be effective in increasing J_c, but the precise physical mechanisms of their action remains elusive. A broader range of experiments is needed in order to elucidate the physics of this phenomenon. Here we discuss the magnetic field H- and temperature T-dependence of the resistivity of thin films in the normal state and near T_c. Pure YBCO films will be compared with those that contain either dispersed Y_2O_3nanoparticles or $BaSnO_3$ nanorods. The resistance of highly c-axis oriented YBCO films was measured by the Montgomery method in the range 20 K $<$ T $<$ 300 K and in fields up to 9 T. The films with inclusions show a much sharper and less broadened in-field transition (smaller T_c suppression by field) than pure YBCO. This correlates well with increased J_c measured by conventional methods and indicates increased pinning strength at all temperatures. In order to further identify the signatures of the nano-inclusions, the samples were annealed in air at 420 deg C. The changes induced by the annealing will be discussed. *This work was partially supported by AFOSR and the AFRL Propulsion Directorate.*

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