COMPARISON OF FLUX PINNING IN SINGLE CRYSTALS AND MELT-TEXTURED $YBa_2Cu_3O_{7-x}$

R. Puźniak, A. Wiśniewski, M. Baran
Institute of Physics, Polish Academy of Sciences,
Al. Lotników 32/46, 02-668 Warsaw, POLAND

9.7 cm

Flux pinning properties of single crystals and melt-textured samples of $YBa_2Cu_3O_{7-x}$ were compared. Magnetization measurements were performed in magnetic fields up to 7 T, for field oriented parallel and perpendicular to the CuO_2 planes (*ab*-planes). For H $\perp$ *ab* pinning is mainly determined by effectiveness of strong pinning centers present in the material (twin boundaries in investigated single crystals and Y_2BaCuO_5 inclusions in melt-textured materials). In melt-textured samples the irreversibility line (IL) is located in the region of higher fields and temperatures in comparison with the position of the IL for single crystals. The decay of the critical current, j_c, with increasing temperature and magnetic field is also slower for melt-textured samples. For H $\parallel$ *ab* the vortex behavior is mainly determined by a very effective intrinsic pinning. In single crystals we observed an increase of j_c with magnetic field, so called "fishtail effect". For H $\perp$ *ab* this effect was observed in a very broad temperature range, whereas for H $\parallel$ *ab*, only at temperatures very close to T_c, where the intrinsic pinning is much weaker. We did not observe the fishtail effect for melt-textured samples. This can be explained taking into account the differences in the effectiveness of pinning centers present in single crystals and melt-textured samples.

13.4 cm

Subject category :

1. Correlated Electrons and High Temperature Superconductors

Presentation mode :
poster

Corresponding author :
R. Puźniak

Address for correspondence :
Dr R. Puźniak
Instytut Fizyki PAN
Al. Lotników 32/46
02-668 Warszawa

Email address :
puzni@ifpan.edu.pl