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M2Po2E-05: Increased current density and pinning force in Ca - doped YBa2Cu3O7-δ / BaZrO3 multilayer thin films over a wide temperature range of 77K –5K with an applied field of 0 –9 Tesla

Tuesday 11 July 2023 14:00 (2 hours)

Utilizing insulating nano-phase materials, such as BaZrO3 (BZO) in YBa2Cu3O7-δ films has been shown to increase flux pinning and current density. However, the defective BZO nanorod interface, resulting from its lattice mismatch with YBCO, prevents obtaining optimum pinning force. This research explores the effect of Ca doped YBCO space layers in the multilayer composite film, on the BZO nanorod / YBCO interface, on films produced by pulsed laser deposition. Magnetic current density and pinning force results at fields ranging from 0 –9 Tesla, will be presented for both high temperature (greater than 65 K), mid temperature (less than 65 K down to 30 K) and low temperature (less than 30 K). These ranges are important for various applications, such as cables and fault current limiters at high temperature and low field, motors and generators at mid temperature and mid field, and NMR and fusion at low temperature and high field.

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