

스퍼터링법에 의한 $BaZrO_3$ 도핑 YBCO 박막의 자속고정 특성 연구

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Flux pinning properties of rf-sputtered YBCO films with $BaZrO_3$ doping

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Abstract : We have fabricated pure YBCO films and $BaZrO_3$ doped ones on CeO_2 buffered YSZ single crystal substrates using rf-sputtering method. In this work, pure YBCO and 2 vol% BZO doped YBCO target were used to investigate the flux pinning properties of BZO doped YBCO films compared to undoped ones. BZO nanodots within the superconducting materials was known to comprise the self-assembled columnar defects along the c-axis from the bottom of YBCO films up to the top surface, thus can be a very strong pinning sites in the applied magnetic field parallel to them. We will discuss the possibility of growing self-assembled columnar defects in the rf-sputtering method. It is speculated that BZO and YBCO phases can separate and BZO form nanodots surrounded by YBCO epitaxial layers and continuous phase separation and ordering between these two materials, which was well studied in Pulsed Laser Deposition method. For this purpose, some severe experimental conditions such as on-axis sputtering, shorter target-substrate distance, high rf-power, etc was adopted and their results will be presented.

Key Words : YBCO, $BaZrO_3$ doping, rf-sputtering, flux pinning

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