Microwave Properties of Large YBCO Films on As-prepared and Annealed MgO Substrates

J. H. Lee *,[a], J. Lim [a], S. Y. Lee [a,b], J. C. Booth [b], S. Schima [b],
J. H. Yoon [c], Y. H. Choi [c], S. H. Moon [c], B. Oh [c]

[a] *Konkuk University, Seoul 143-701, Korea*

[b] *NIST, Boulder CO, U.S.A.*

[c] *LG Electronics Institute of Technology, Seoul 137-724, Korea*

A recent report on nonlinear dielectric microwave losses in MgO makes it clear that there are certain limits in using MgO as the substrates for YBaCuO (YBCO) films for microwave applications. We have studied the microwave surface impedance of large YBCO films on as-prepared MgO substrate and on annealed MgO substrate with 50 mm in diameter. YBCO films were prepared by pulsed laser deposition. The surface resistance (Rs), homogeneity in the Rs, and structural properties of YBCO on as-prepared MgO were compared with those of YBCO on annealed MgO.

The nonlinear microwave properties of the YBCO films were also measured using higher order harmonics of patterned microwave devices and compared with each other. Effects of annealing of MgO substrate on the microwave properties of YBCO are discussed.

keywords : Microwave Properties, YBCO, MgO