

Abstracts

Stripline Resonator Measurements of $Z_{\text{sub } S}$ / Versus $H_{\text{sub rf}}$ in $\text{YBa}_{\text{sub } 2}\text{Cu}_{\text{sub } 3}\text{O}_{\text{sub } 7-x}$ / Thin Films

D.E. Oates, A.C. Anderson, D.M. Sheen and S.M. Ali. "Stripline Resonator Measurements of $Z_{\text{sub } S}$ / $H_{\text{sub rf}}$ in $\text{YBa}_{\text{sub } 2}\text{Cu}_{\text{sub } 3}\text{O}_{\text{sub } 7-x}$ / Thin Films ." 1991 Transactions on Microwave Theory and Techniques 39.9 (Sep. 1991 [T-MTT] (Special Issue on Microwave Applications of Superconductivity)): 1522-1529.

We report measurements of the surface impedance, $Z_{\text{sub } S}$, of $\text{YBa}_{\text{sub } 2}\text{Cu}_{\text{sub } 3}\text{O}_{\text{sub } 7-x}$. thin films using a stripline resonator. The films were deposited on $\text{LaAlO}_{\text{sub } 3}$ substrates by off-axis magnetron sputtering. We obtained $Z_{\text{sub } S}$ as a function of frequency from 1.5 to 20 GHz, as a function of temperature from 4 K to the transition temperature (~ 90 K), and as a function of the RF magnetic field from zero to 300 Oe. At low temperatures the surface resistance, $R_{\text{sub } S}$, of the films shows a very weak dependence on the magnetic field up to 225 to 250 Oe. At 77 K, $R_{\text{sub } S}$ is proportional to the square of the field. The penetration depth shows a much weaker dependence on the field than does $R_{\text{sub } S}$. At 1.5 GHz the surface resistance of the best films is 2×10^{-6} Omega at 4 K and 8×10^{-6} Omega at 77 K. We also discuss the origins of the magnetic field dependence of $Z_{\text{sub } S}$.

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