

Fabrication of YBCO dc-SQUID Magnetometers with Multi-loop Pickup Coil Design

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We have designed and fabricated YBCO directly-coupled SQUID magnetometers for the application of very weak magnetic signal measurement under magnetically disturbed environments. Magnetometer was fabricated with a single layer YBCO thin film deposited by PLD method on STO bicrystal substrate with misorientation angle of 30° . The deposition conditions had been optimized for best YBCO thin film on STO substrates, yielding $T_C \geq 89$ K, $(TC \leq 0.5$ K, and $J_C = 4(106$ A/cm². Thus fabricated devices exhibit excellent SQUID magnetometer properties of high performances with long lifetime and stable operations even under laboratory environment. We could achieve high performance devices with a magnetic field noise BN of 30 fT/Hz^{1/2} at 100 Hz, and less than 70 fT/Hz^{1/2} at 1 Hz.