ABSTRACT

Title：Fabrication of YBCO Thin-Film Devices and Construction of Voltage-Current Characteristics Measurement System

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Keywords：$YBa_2Cu_3O_{7-x}$ (YBCO) thin film, Superconducting Quantum Interference Devices (SQUIDs), Voltage-current curves

The fabrication parameters of $YBa_2Cu_3O_{7-x}$ (YBCO) thin film, superconductive micro bridges, and Superconducting Quantum Interference Devices (SQUIDs) were investigated. The YBCO thin film was grown by using a RF magnetron sputtering system, and the micro-bridges and SQUIDs were formed by using photolithography and wet-etching processes. The experimental results showed that the critical temperature was the highest for the oxygen-to-argon flow-rate ratio of 69%：31%, provided that the optimum heater power was used during deposition. In addition to the was built in this work. The built system was used for measuring the voltage-current YBCO film fabrication, the measurement system for voltage-current characteristics curves of the fabricated superconductive micro-bridges and SQUIDs. The system consists of a homemade current waveform generator, a preamplifier, an oscilloscope, a data acquisition unit, and a personal computer. The output of the current waveform generator ranges from 10 μA/V to 10 mA/V. Batteries was used to provide the main