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High-T_c Josephson Devices

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$YBa_2Cu_3O_{7-\delta}$-Based Edge-Geometry SNS-type Josephson Junctions with Various Normal Layers.* **J.** B. Barrier, B. D. Hunt, M. C. Foote, T. P. Pike, and R. P. Vasquez, *Center for Space* **Microelectronics Technology,** *Jet Propulsion Laboratory, California Institute* **of** Technology--High-quality, **epitaxial** superconductor(S)/normal(N)/S edge-geometry weak-link Josephson devices were fabricated. The formation of the active device is on a tapered (60° from normal) edge of a c-axis oriented $YBa_2Cu_3O_{7-\delta}$(YBCO) film. We have employed a number of normal materials including $PrBa_2Cu_3O_{7-\delta}$(PBCO), normal-YBCO and ion- damaged YBCO layers. All of these N layers have produced devices with excellent ac and dc Josephson behavior and we will present a comparison of the junction performance for each N layer. The temperature dependence of the junction parameters---critical current (I_c) and normal resistance (R_n)—indicates that these materials behave differently. **All** devices show a $(1 - T/T_c)^2$ dependence of I_c for temperatures (T) near the device critical temperature (T_c). At **low** T, devices with thick PBCO N layers show an exponential I_c dependence **with** decreasing T while the other materials show a nearly linear dependence, The **device** resistance is temperature dependent for all the materials. A model based on measured resistivities and estimated interface resistances **will** be discussed to understand the conduction through the various N layers in the devices.

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Prefer Standard Session

Jeff Barrier (APS #MBA559404)
Jet Propulsion Laboratory
California Institute of Technology
4800 Oak Grove Dr.
Mail/Stop 302-231
Pasadena, CA 91109
(818) 354-7353