

**High  $T_c$  SNS Weak Links Using Co-Doped YBCO Normal Metal Layers on  $LaAlO_3$  and SOS Substrates**, B.D. HUNT, J.B. BARNER, M.C. FOOTER, and R.P. VASQUEZ, Jet Propulsion Laboratory, Pasadena, CA USA -- High  $T_c$  SNS weak links are expected to prove useful for a variety of high frequency applications, which require high quality Josephson devices on moderate-to-low-dielectric-constant substrates. This work examines the properties of epitaxial edge-geometry SNS weak links utilizing YBCO electrodes and  $YBa_2Cu_{3-x}Co_xO_7$  (YBCCO) normal metal layers. Devices have been fabricated on  $LaAlO_3$  with YBCCO- $Co_{0.2}$  layers ranging from 65 to 550 Å. These devices exhibit high-quality RSJ IV curves, with strong microwave and magnetic field response. The critical currents scale exponentially with barrier thickness, with a normal metal coherence length of  $\approx 50$  Å at 60 K. This technology has been used to fabricate Westinghouse-designed shift registers and SQUID amplifiers. In addition, high quality SNS weak links with YBCCO barriers have also been fabricated on a novel STO/YBCO/YSZ buffer system on silicon-on-sapphire (SOS) substrates. This buffer system eliminates problems with grain boundary weak links seen in devices on single YSZ buffer layers on SOS, while the use of SOS substrates ( $\epsilon \approx 10$ ), should enable higher frequency operation, as well as integration with Si circuitry. Current work is focused on extending these studies to weak links with different Co doping levels.

Presort Category: ii-4  
Registrant: Brian D. Hunt  
Correspondence Author: Brian D. Hunt  
Jet Propulsion Laboratory  
4800 oak Grove Drive  
MS 302-231  
Pasadena, CA 91109 USA  
Tel: (818)-354-9186  
Fax: (818)-393-4540  
ii-mail: bhunt@vaxeb.jpl.nasa.gov  
Preference: oral

I, the registrant for this paper, am willing to review papers in the following subcategories:

ii-4, M-1 (I am a Review Committee Member, so please minimize additional papers!)