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Observation and Modeling of Splitting vs. Non-Splitting of the Zero-bias Conductance Peak in YBCO Planar Tunnel Junctions P.J. HENTGES[1], L.H. GREENE, Physics and Frederick Seitz Materials Research Laboratory, University of Illinois at Urbana-Champaign, G. WESTWOOD[2], W.G. KLEMPERER, Chemistry and Frederick Seitz Materials Research Laboratory, University of Illinois at Urbana-Champaign — Planar tunneling spectroscopy is performed on YBCO thin films grown at four different crystallographic orientations. Tunneling insulators are deposited via a patented solution-based zirconia deposition process [Greene et al, J. Mater. Chem. 14, 1 (2004)]. The characteristics of the tunneling conductance and its dependence on magnetic field, temperature and injected current are cataloged with the three different counter- electrode deposition techniques used. Modeling of the data show that by varying the value of the tunneling cone, surface faceting and quasiparticle lifetime, in agreement with the observations, splitting vs. non-splitting of the zero-bias conductance peak can be understood [Hentges, PhD Thesis, UIUC (2004)]. This work is support by the DoE DEFG02-91ER45439, through the FSMRL and the Center for Microanalysis of Materials.

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