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I-V Characteristics vs. Spatial Dissipation Maps in YBCO Grain Boundary on Bicrystal Substrates[1] CHUHEE KWON, MEGUMI YAMAMOTO, SAMUEL POTTISH, California State University Long Beach, TIMOTHY HAUGAN, PAUL BARNES, Air Force Research Laboratory, CALIFORNIA STATE UNIVERSITY LONG BEACH COLLABORATION, AIR FORCE RESEARCH LABORATORY COLLABORATION — Grain boundary (GB) properties of YBCO films on SrTiO3 bicrystal substrates with 24 degree misorientations are examined by transport and scanning laser microscopy (SLM) techniques. Thermoelectric SLM clearly shows the location of grain boundaries, and variable temperature SLM confirms that GB has lower Tc. A series of I-V measured in superconducting states exhibit clear step-like features identified in earlier papers as sub-gap structures. The low temperature SLM shows a close relation between the step-like features and the local dissipation pattern in GB. We believe that the activation of Fiske steps is responsible for the step-like I-V, and SLM images show the spatial pattern of the self-excited resonance in GB. We will also discuss how Ca-doping and nanoparticle additions on YBCO affect the junction properties.

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