Fabrication and Millimeterwave Property of HTS Josephson Junction by Excimer Laser Patterning

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YBCO film on MgO crystal substrate was successfully patterned by using 248 nm excimer laser and photo mask. The film of ~ 2000 Å thickness was covered with the photo mask and etched off by the pulse laser. The etching rate was ~ 3 Å/pulse. The strip line width for the junction was 10 um. SEM and AFM picture show that the patterned YBCO film has a sharp and clean edge. Tc and Jc were the same as for unpatterned YBCO film, indicating that laser patterning did not vary sample quality. With the same patterning process, Josephson junction was fabricated on MgO bicrystal substrate. Its millimeterwave (60 GHz) property was measured at 77 K.

Keywords: HTS Josephson junction, Excimer laser patterning, millimeter wave properties(60 GHz band), MgO bicrystal Josephson junction