

## The YBCO Films with Zr<sup>4+</sup> Doping Grown by MOD Method

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**Abstract**—YBa<sub>2</sub>Cu<sub>3</sub>O<sub>7-δ</sub> (YBCO) films with Zr doping have been prepared successfully by the trifluoroacetate metal-organic deposition (TFA-MOD) method through dissolving Zr acetylacetonate into the precursor solution. Ytria-stabilized zirconia YSZ nanoparticles were detected in the doped YBCO films by XRD and SEM. From the analysis of XRD  $\omega$  and  $\phi$  scans, the doped films have better out-of-plane and in-plane textures than those of the un-doped YBCO film. Although the doped YBCO films have lower  $T_c$  than that of the un-doped YBCO film, a very significant enhancement of  $J_c$  is displayed as compared to the undoped film at applied fields. A high  $J_c$  near 105 A cm<sup>-2</sup> at 2 T, 77K was observed in the Zr doped film, which is 30 times of the  $J_c$  values for the un-doped film in the same applied fields, indicating that an effective pinning force was created by Zr doping.

**Index Terms**—Nanoparticle doping, TFA-MOD, YBCO film

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