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[Invited] Enhanced pinning in heavily-doped REBCO coated conductors

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Critical current density over 20 MA/cm^2 has been achieved at 30 K, 3 T (B||c) in RE-Ba-Cu-O (REBCO, RE=rare earth) coated conductors made by metal organic chemical vapor deposition (MOCVD) with addition of Zr at levels as high as 25 mol.%. Flux pinning force over 1.7 TNm^{-3} has also been achieved at 4.2 K. We have observed a strong dependence of the critical current performance and the (Ba+Zr)/Cu content in the films and in turn, the c-axis lattice parameter. Continuous growth of highly-aligned BaZrO₃ (BZO) nanocolumns has been tuned by the difference in lattice parameters of REBCO and BZO. Using a better control of the growth process using Advanced MOCVD, even superior pinning and critical currents have been achieved and extended to thick films as well. The latest advances in the improvement of pinning of heavily-doped REBCO coated conductors will be discussed in this presentation.

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