

Fabrication of long REBCO coated conductors by pulsed laser deposition process

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High quality long REBCO coated conductors have been successfully fabricated on flexible polycrystalline metal tapes by PLD plus magnetron sputter and IBAD processes. Under optimized conditions, the IBAD-MgO layers showed in-plane phi-scan rocking curve of 4-6 degrees. AFM observation showed the RMS for IBAD-MgO layer was less than 1nm. On the textured IBAD-MgO layer, sputter deposited single cerium oxide cap-layer showed pure (001) orientation and in-plane texture of 3-4 degree. Reel-to-reel PLD process with high deposition rate was already scaled up to 100m/h tape speed. One micrometer thick REBCO films had a high critical current density of over 4.0 mega ampere per square centimeter (at 77 K, in zero magnetic field). The critical current density of two micrometer thick films is still more than 3.0 mega ampere per square centimeter. Hundred meters long coated conductor tapes with over 500A/cm performance have been routinely fabricated. Currently, the process optimization for kilometer long coated conductor tapes is underway.