Texture Formation in Long Length Ni and Ni-W Alloy Tapes for YBCO Coated Conductors

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Ni and Ni-W alloys were prepared by powder metallurgy process. The Ni and Ni and W powders (Ni-1%W, Ni-13%W, Ni-5%W) were mixed by ball milling using ZrO_2 balls. The power mixtures were put in a rubber mold and isostatically pressed into rod-like shape. The Ni and Ni-W alloy rods were sintered at 1000℃ for 6 h at a 4%H_2-96%Ar atmosphere. The sintered rods were cold rolled with 5% reduction at each path and then made into thin tapes with a thickness of 100 microns and length of 5-6 meters. Parts of the long length tapes were cut by 50 cm and annealed at 1000℃ for 30 min at the reduction atmosphere. The X-ray diffraction and X-ray pole figure were carried out for the annealed tapes to understand the in-plan and out of plan alignments. All annealed tapes shows the formation of the (200) cube texture represented by the strong symmetric 4 poles with [111]//ND (direction normal to the rolling direction). The in-plane and out of plane texture were dependent on the W composition. In case of pure Ni tapes, the in-plane alignment was in the range of 8-10 ° and the out of plan alignment was 4-7 °. The in-plane alignment was improved by addition of W and the degree was proportional to the W content, while the out of plan alignment became worse by the W addition. We discussed the formation mechanism of the cube texture in Ni and Ni-W alloy tape and the effect of W addition.

keywords : substrate, coated conductor, powder, texture

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