

The Effect of Carbon in bi-axially Textured Substrate on Buffer Layers of Superconducting Coated Conductor

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Carbon in bi-axially textured substrate has bad effects on the buffer layers of coated conductor, such as making holes on the buffer layer and resulting in de-lamination of coated conductor. Therefore it is inevitable to reduce the diffusion of carbon from internal substrate to the boundary of buffer layer and substrate in order to have robust buffer layers. We studied that how the density of holes on $Y_2O_3/Ni_{97}W_3$ is changed by the parameter of the substrate temperature and deposition time. The density of holes on $CeO_2/Ni_{97}W_3$ was compared with that of holes on $Y_2O_3/Ni_{97}W_3$ in the same deposition condition. In order to reduce the carbon content in $Ni_{97}W_3$ substrate, Pre-annealing process of $Ni_{97}W_3$ substrate was done. The mixed gas of oxygen (100 ppm) and Argon were used as annealing atmosphere with the total pressure of 200mTorr at temperatures of 650°C and 750°C. We observed that carbon content decreases drastically on increasing the annealing time. Higher annealing temperature made the diffusion of carbon faster. That result in shorter annealing time to remove the carbon from substrate. By means of this result, We could obtain good surface morphology without any holes.

key words : de-carbonation, coated conductor, Y_2O_3 , CeO_2