

Surface Morphology of CeO₂ Films Grown on Textured Ni Substrates by a MOCVD Process

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CeO₂ are widely used as a seed layer for YBCO coated conductors because of the lattice constant similar to YBCO. Up to now, the CeO₂ film was deposited on the textured Ni tapes by physical vapor deposition methods such as sputtering, evaporation and pulsed laser deposition. In this study we prepared CeO₂ films by metal organic chemical deposition method using single liquid solution and the growth behavior was investigated. The solid Ce(tmhd)₄ was dissolved in tetrahydrofuran (THF) to make a liquid source. The liquid source was delivered into a MOCVD chamber using a reel-to-reel device containing the source. The (200) CeO₂ films were obtained at deposition temperature (T_d) of 500-530 °C and oxygen partial pressure (P_{O_2}) of 2.3 torr, while the (111) CeO₂ films were obtained at other conditions. The (200) and (111) alignment was dependant on the films thickness. When the film was thin, the (111) alignment was prefer, while the (200) growth was prefer when the film thickness increased. The (200) growth in the thick films may be attributed to the difference in growth rate between the (200) and (111) films. The surface of the (200) oriented CeO₂ films consisted of small rectangular grains, but the (111) oriented CeO₂ films consisted of star-like grains with a lot of dendritic or cellular arms. We discussed the growth mechanism of the CeO₂ films prepared by a MOCVD method.

keywords : metal-organic chemical vapor deposition, growth mechanism

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