

## Epitaxial Growth of CeO<sub>2</sub> and Y<sub>2</sub>O<sub>3</sub> Buffer-layer Films on Textured Ni Tapes Using RF Magnetron Sputtering

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We comparatively studied the epitaxial growth conditions of CeO<sub>2</sub> and Y<sub>2</sub>O<sub>3</sub> thin buffers on textured Ni tapes using rf magnetron sputtering and investigated the feasibility of getting single mixture layer or sequential layers of CeO<sub>2</sub> and Y<sub>2</sub>O<sub>3</sub> for more simplified buffer architecture. All buffer layers were first deposited using the reducing gas of Ar/4%H<sub>2</sub> and subsequently the reactive gas mixture of Ar and O<sub>2</sub>. The crystalline quality and biaxial alignment of the films were investigated using X-ray diffraction techniques ( $\theta$ -2 $\theta$ ,  $\varphi$  and  $\omega$  scans, pole figures). CeO<sub>2</sub> single layer exhibited well developed (200) epitaxial growth below 450°C, but Y<sub>2</sub>O<sub>3</sub> showed much smaller window of temperature condition for (400) epitaxial growth. The sequential architecture of CeO<sub>2</sub>/Y<sub>2</sub>O<sub>3</sub>/CeO<sub>2</sub> having good epitaxial property was achieved by sputtering at the substrate temperature of 700°C on the CeO<sub>2</sub> bottom layer sputtered at 400°C. To get high quality of single buffer layer, co-deposition of CeO<sub>2</sub>-Y<sub>2</sub>O<sub>3</sub> was adopted at various sputtering conditions and discussed the feasibility of getting proper epitaxial growth.

keywords : buffer layer, CeO<sub>2</sub>, Y<sub>2</sub>O<sub>3</sub>, rf magnetron sputtering, texture