

# A Comparative Study on Epitaxial Properties of Various Buffer Layers on IBAD-MgO Template

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On the biaxially textured ion-beam assisted deposition (IBAD) MgO template, we report the epitaxial growth of BaMO<sub>3</sub> (M = Zr, Sn, and Ti) buffer layers. The BaSnO<sub>3</sub> (BSO) and BaTiO<sub>3</sub> (BTO) films have been deposited on the IBAD-MgO template at various substrate temperatures (T<sub>S</sub>) and deposition time by pulsed laser deposition (PLD). For a comparison, BaZrO<sub>3</sub> (BZO) films have been also prepared with increasing deposition time. The crystalline quality of BSO and BTO films could be improved at higher T<sub>S</sub>. As deposition time increases, BZO and BSO buffer layers exhibited extra peaks, implying an imperfect biaxial texture. BSO films had a relatively fast growth rate, corresponding to ~2.6 Å/s. The optimized BZO, BSO, and BTO films exhibited  $\Delta$  of 6.1°, 6.3°, and 6.3°, respectively. Also, the surface roughness of those showed 5.1, 8.7, and 6.5 nm, respectively. In this study, detailed deposition conditions of several buffer layers will be discussed together with the results of surface roughness, microstructure and in-plane alignment. This research was supported by a grant from Center for Applied Superconductivity Technology of the 21<sup>st</sup> Century Frontier R&D Program funded by the Ministry of Education, Science and Technology.

keywords : IBAD, BaSnO<sub>3</sub>, BaHfO<sub>3</sub>, buffer layer