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Influence of step heights and terrace lengths of bottom electrodes on structural and ferroelectric properties of BiFeO₃ thin films JAE-WAN PARK, SEUNG-HYUB BAEK, CHANG-BEOM EOM, University of Wisconsin-Madison, OXIDE LABORATORY TEAM — The ferroelastic domain structures of epitaxial ferroelectric thin films are critical to control the ferroelectric properties. We have already demonstrated the selection of ferroelastic domain structure variants in epitaxial BiFeO₃ films and consequently significant improvement in ferroelectric switching behavior and leakage current by employing miscut in cubic (001) SrTiO₃ substrates. We have also observed significant step bunching in the SrRuO₃ bottom electrode and BiFeO₃ thin films on high miscut substrates resulting in significant surface roughness. In particular, the formation of step bunching causes different step heights and terrace lengths which can affect the growth behaviors of subsequent epitaxial films. We have studied the influence of step bunching of SrRuO₃ bottom electrodes on structural and ferroelectric properties of BiFeO₃ thin films grown on SrRuO₃ bottom electrodes by sputtering. We have varied the step heights and terrace lengths of SrRuO₃ bottom electrodes on 0.2° miscut (001) SrTiO₃ substrates by controlling of the growth conditions such as laser energy and pulse frequency in pulsed laser deposition. We will discuss the relationship between underlying step structures and the ferroelectric properties of epitaxial BiFeO₃ films.

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