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**Tuning the phase mixture state of superconducting BaPb<sub>1-x</sub>BixO<sub>3</sub> by using heteroepitaxial strain** JIN-KWON KIM, HAN-GYEOL LEE, MINU KIM, TAE WON NOH, Seoul Natl Univ — The crystal structure of high- $T_c$  superconductor BaPb<sub>1-x</sub>BixO<sub>3</sub>(BPBO,  $T_c = 12$  K) is associated with a doping rate  $x$  and temperature  $T$ . At low  $T$ , the structure of BPBO tends to orthorhombic and an orthorhombic to tetragonal transition occurs as  $T$  is increased. However, these phases coexist in a wide range of  $x$  due to the first-order nature of this phase transition. Therefore, the phase mixture state of BPBO does not simply depend on the  $x$  and  $T$ . Since superconductivity of BPBO only occurs in tetragonal phase, engineering the phase mixture state of BPBO would be critical for enhancing  $T_c$ . Here, we demonstrate that strain engineering of a BPBO thin film could be useful for controlling the volume ratio of tetragonal and orthorhombic phases. We fabricated and optimized the growth conditions of BPBO films by pulsed laser deposition technique. Also we characterized the resultant crystal structure and surface morphology using X-ray diffraction and atomic force microscopy. By utilizing buffer layer technique, we could impose proper biaxial strain to BPBO films, as revealed by X-ray diffraction. In the presentation, we will discuss the relationship between superconductivity and crystal structure in more detail.

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