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Probing Enhanced Ferroelectricity in Strained SrTiO3 and BaTiO3 Epitaxial Films using optical Second Harmonic Generation ALOK SHARAN, ARAVIND VASUDEVA RAO, VENKATRAMAN GOPALAN, Materials Research Inst., Penn State Univ., MIKE BIEGALSKI, DARRELL G. SCHLOM, Dept. of Materials Science and Engineering, Penn State Univ., YULAN L. LI, LONG-QING CHEN, KYOUNG JIN CHOI, CHANG BEOM EOM, Dept. of Materials Science and Engineering, Univ. of Wisconsin-Madison, MATERIALS RESEARCH INST., PENN STATE UNIV. TEAM, DEPT. OF MATERIALS SCIENCE AND ENGINEERING, PENN STATE UNIV. TEAM, DEPT. OF MATERIALS SCIENCE AND ENGINEERING, PENN STATE UNIV. TEAM, DEPT. OF MATERIALS SCIENCE AND ENGINEERING, UNIV. OF WISCONSIN-MADISON TEAM — This talk will present real-time second harmonic generation (SHG) experiments used for *in-situ* probing of ferroelectric domain reversal and phase transitions in *strained* $SrTiO_3$ and $BaTiO_3$ epitaxial thin films grown commensurately on scandate substrates such as $GdScO_3$ and $DyScO_3$. The Curie temperature, T_c shifts by hundred of degrees because of the compressive strains (up to -1.5%) imparted to these films. Using SHG we find that Tc shifts to ∼27C in $SrTiO_3$ (which normally is not ferroelectric at any temperature) and to ∼650C for $BaTiO_3$ thin films on $DyScO_3$ as compared to T_c of 120C in bulk crystals. Studies on real-time dynamics of domain reversal under external fields in these strained films beyond their normal Curie temperatures where domains are not expected at all would also be presented.

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