

# Room-temperature ferroelectricity in freestanding SrTiO<sub>3</sub> ultrathin films

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## Abstract

To integrate oxide and semiconductor, free-standing (FS) techniques provides great degrees of freedom and potential. It has been adopted in a wide spectrum of applications, including Microelectromechanical Systems, catalysis, sensors, tissue engineering and so on. Also, this offers more possibilities for the development of materials.

In this work, we demonstrate the obviously room-temperature ferroelectricity in freestanding strontium titanate (SrTiO<sub>3</sub>, STO) ultrathin films. The ferroelectric property was verified via contact Kelvin probe force microscopy (cKPFM), while the lattice exhibits a structure transition from cubic to tetragonal, carried out by reciprocal space mapping. The spatial symmetry breaking of STO lattice is originated from Sr vacancy and polar nanoregion, leading to the switchable polarity in ultrathin STO thin films. Our results not only provide a promising option served as a candidate of ferroelectric materials but also pave a new way for the development of material integration engineering.

**Keywords** - *freestanding, ferroelectric, SrTiO<sub>3</sub>*

## References

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