

# Scanning tunneling microscopy study of FeSe films

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Single-layer FeSe films grown on SrTiO<sub>3</sub> substrate show a relatively high T<sub>c</sub> of 65K<sup>[1]</sup>, while the growth of these films on thick BaTiO<sub>3</sub>/KTaO<sub>3</sub> substrates with T<sub>c</sub> up to 75K<sup>[2]</sup>. Such a high T<sub>c</sub> in the FeSe films is surprising when considering that their bulk compound has only a T<sub>c</sub> of 8K, although this can be enhanced to 37K under high pressure<sup>[3-4]</sup>. Since this system is so non-trivial but structurally the simplest example of an iron-based high temperature superconductor, we try to grow one-unit-cell(UC) FeSe films by molecular beam epitaxy (MBE) as reported<sup>[5]</sup> with different conditions and use scanning tunneling microscopy/spectroscopy (STM/T) to find out the role of the interface between the single-layer FeSe films and the Nb-STO/STO/KTO substrates in generating high-T<sub>c</sub> superconductivity. By various adjustment of treatment conditions, we find that annealing temperature is crucial for both FeSe growth and substrates preparation. Especially when growing FeSe on oxide heterostructures, more attention should be paid to the temperature to avoid damaging one of the substrates.

## Reference

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