Controlling Fundamental Electronic Interactions in SrTiO3 Thin Films by Ni Doping

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Abstract. Strontium titanate ($SrTiO_3$) has been a subject of intensive discussion in recent years both experimentally as well as theoretically. Strontium titanate is an insulator with a large band gap (Eg=3.2 eV), but it can become conductive by doping with transition metals or oxygen vacancies [1]. Here we report the fabrication and electronic properties of Ni doped SrTiO3 polycrystalline and crystalline films. The polycrystalline films were prepared by reactive magnetron co-sputtering with different Ni concentration. Whereas the crystalline films were grown by pulsed laser deposition (PLD). In this experimental investigation, we used high energy ARPES and core level spectroscopy to perform the electronic properties of the films as a function of doping concentration. Our experimental results were supported by ab-initio calculations using SPR-KKR's one-step model of photoemission [2,3].

References

1. F. Alarab et al., AIP Conference Proceedings **1996,** 020001 (2018).
2. Braun, Rep. Prog. Phys. **59**, 1267-1338 (1996).
3. H. Ebert, D. Kodderitzsch and J. Minar, Rep. on Prog. in Phys. **74**, 096501 (2011).