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Research field: Inorganic Functional Films

Research topics conducted within the G-COE project

1. Topics

**Development of Dielectric Materials**

Dielectric materials consist of multi layer stacks with nanometer thickness are investigated by designing the crystal structure and chemical composition.

This generate novel dielectric property down to the nanometer thickness.

**Development of Probing Method of Dielectric Property in Nanometer Region**

To make clear the dielectric property in nanometer region, novel measurement methods are investigated.

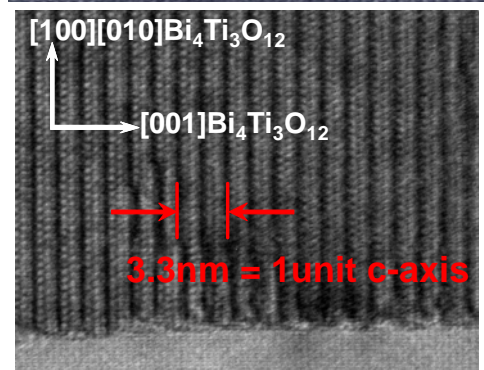
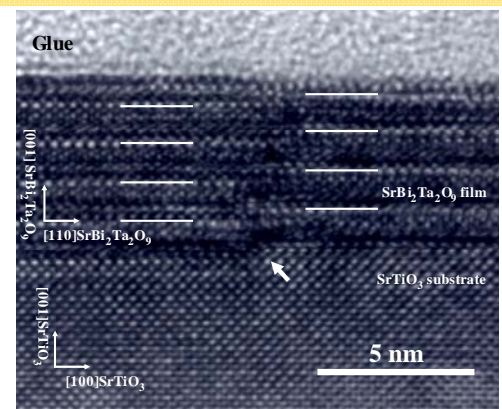


Fig. Orientation controlled dielectric materials having layer structure

**Representative publications**

- K.Takahashi, *et al.*, “Thickness dependence of dielectric properties in bismuth layer-structured dielectrics”, *Appl. Phys. Lett.*, 89 (2006) 082901-1-3.
- K. Nishida, *et al.*, “Enhancement of field-induced strain by La substitution in epitaxial  $\text{Pb}(\text{Zr},\text{Ti})\text{O}_3$  films grown by metal organic chemical vapor deposition”, *Appl. Phys. Lett.*, 90 (2007) 262902-1-3.
- K Kawano, *et al.*, “Low-Temperature Preparation of Metallic Ruthenium Films by MOCVD Using Bis(2,4-dimethylpentadienyl)ruthenium”, *Electrochem. Solid-State Lett.*, 10(6) (2007) D60-D62.
- T. Watanabe, *et al.*, “Probing intrinsic polarization properties in bismuth-layered ferroelectric films”, *Appl. Phys. Lett.*, 90 (2007)112914-1-3.
- S. Ito, *et al.*, “Effect of the thermal expansion matching on the dielectric tenability of (100)-one-axis-oriented  $(\text{Ba}_{0.5}\text{Sr}_{0.5})\text{TiO}_3$  thin films”, *Appl. Phys. Lett.*, 90, (2007)142910-1-3.
- H.Kuwabara, *et al.*, “Strain and in-plane orientation effects on the ferroelectricity of (111)-oriented tetragonal  $\text{Pb}(\text{Zr}_{0.35}\text{Ti}_{0.65})\text{O}_3$  thin films prepared by metal organic chemical vapor deposition”, *Appl. Phys. Lett.*, 90, (2007) 222901-1-3.