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## Composition dependence of dielectric function in ferroelectric $\text{BaCo}_x\text{Ti}_{1-x}\text{O}_3$ films grown on quartz substrates by transmittance spectra

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Near-infrared-ultraviolet optical properties of  $\text{BaCo}_x\text{Ti}_{1-x}\text{O}_3$  (BCT) ( $x$  from 1.0% to 10%) films have been investigated by the transmittance spectra. The dispersion functions in the photon energy range of 1.24–6.2 eV have been extracted by fitting the experimental data with **Adachi's** model. It was found that the oscillator and dispersion energies linearly increase with the Co composition and the maximum optical transition occurs near the energy range of 4.3–5.0 eV for the BCT materials. The absorption coefficient at the visible region linearly increases with the composition due to grain boundaries and disorder induced band tail into the forbidden gap.

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### KEYWORDS and PACS

#### Keywords

absorption coefficients, barium compounds, cobalt compounds, dielectric function, dielectric thin films, energy gap, ferroelectric materials, grain boundaries, infrared spectra, permittivity, quartz, ultraviolet spectra, visible spectra

#### PACS

- 77.55.-g**  
Dielectric thin films
- 77.22.Ch**  
Permittivity (dielectric function)
- 78.20.Ci**  
Optical constants (including refractive index, complex dielectric constant, absorption, reflection and transmission coefficients, emissivity)
- 78.30.Hv**  
Other nonmetallic inorganics
- 77.84.Ek**  
Niobates and tantalates
- 77.84.Cg**  
PZT ceramics and other titanates
- 78.66.Nk**  
Insulators

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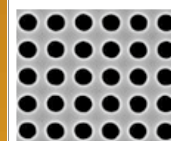
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