

Abstract Submitted  
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**Spontaneous Emergence of Free Carrier at Phase Transitions of Insulating BaTiO<sub>3</sub> Single Crystals** YUKIO WATANABE, Kyushu Univ., HIROTAKA YOSHIOKA, YOSUKE URAKAMI — A novel phenomenon that is probably universal in a wide range of ferroelectric oxides is found. We have measured *DC* current-voltage characteristics (*IVC*) of undoped insulating and doped BaTiO<sub>3</sub> single crystals grown by different methods. We find that a small but finite *dc* conductance that is not due to impurities or thermal excitations appears at all three ferroelectric phase transitions. The conductance of the crystals is typically  $1 \text{ n}\Omega^{-1}\text{cm}^{-1}$  at the peak of the paraelectric-ferroelectric transition. The conductance is mostly evident in undoped insulating crystals that possess the spontaneous polarization perpendicular to the surface. However, we confirmed that the pyroelectric current or the dielectric relaxation, or the partial polarization reversal is excluded as origin of the observed conductance.

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