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Carrier Diffusion Model for Electrical Conductivity Response of Bi3TiNbO9 to Ambient Humidity[1] RICARDO E. AVILA, DMN, CCHEN, Cas. 188-D, Santiago, Chile, ALICIA CASTRO, ICMM, CSIC, Madrid, Espaa, DANIEL SERAFINI, HCTOR ULLOA, Depto. de Fsica, USACH, Santiago, Chile — The electrical properties of the metastable phase of Bi_3TiNbO_9 isomorphic to δ-Bi_2O_3, in ceramic pellet form have been established. Pellets are formed by mechanochemical activation (1 to 48 h in an SPEX 8000 automatic mill), and uniaxial pressing, leading to the metastable phase in the 310 to 490 $^\circ$C, as the activation time increases. Correspondingly, the stable Aurivillius phase forms in the 500 to 600 $^\circ$C range. The current through pellets with $\sim$10 nm thick sputtered Pt electrodes increase by factors between 10 an 2000 in a transient from dry air to dew point of 10 $^\circ$C at room temperature. The response time (10% to 90% of the current rise) is in the 15 to 30 s range, and it does not deteriorate under saline ambient, nor does it depend on the dry carrier gas (air, Ar, N_2, O_2, or 0.1% H_2 / He). A bulk carrier diffusion model achieves a close qualitative fit to the current response to bias and humidity cycling.

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