Abstract Submitted
for the MAR06 Meeting of
The American Physical Society

Time-dependent space-charge-limited conduction HO-KEI CHAN, School of Physics and Astronomy, University of Manchester, Manchester (U. K.), YAN ZHOU, CHI-HANG LAM, F.G. SHIN, Department of Applied Physics, Hong Kong Polytechnic University, Hong Kong — The concept of time-dependent space-charge-limited conduction (TDSCLC) was introduced in 2004 to account for the well-known observation of polarization offsets in compositionally graded ferroelectric films [1]. It is a generalization of Mott's steady-state SCLC model ($J \sim V^2$) [2] to include two carrier types (p and n) and time dependence. Subsequently it was found to have a wider applicability in explaining the imprint phenomenon commonly observed in homogeneous ferroelectric films [3]. Here we would like to review the derivation of the TDSCLC formula and its relation to the steady-state SCLC model, and discuss its applicability to other electrical insulators.

[1] H. K. Chan, C. H. Lam, and F. G. Shin, J. Appl. Phys. 95, 2665 (2004)
[2] R. Coelho, Physics of Dielectrics for the Engineer (Elsevier Scientific, New York, 1979), pp. 123-125
[3] Y. Zhou, H. K. Chan, C. H. Lam, and F. G. Shin, J. Appl. Phys. 98, 024111 (2005)

Ho-Kei Chan
School of Physics and Astronomy
University of Manchester, Manchester (U. K.)

Date submitted: 28 Nov 2005 Electronic form version 1.4