

Turkish Journal of Physics

Turkish Journal

of

Physics

AMPS-1D Modeling of a-Si:H $n^+ - i - n^+$ Structure: the Validity of Space Charge Limited Current Analysis

A. ERAY, G. NOBILE

Hacettepe University, Department of Physics Engineering,
06532 Beytepe, Ankara-TURKEY

ENEA Research Center, Loc. Granatello, I-80055, Portici (NA)-ITALY

e-mail: feray@hacettepe.edu.tr

 [Keywords](#)
[Authors](#)



phys@tubitak.gov.tr

[Scientific Journals Home Page](#)

Abstract: In this paper, the AMPS-1D (Analysis of Microelectronic and photonic structure) simulation program is used to understand the origin of the differences observed in Space Charge Limited Current (SCLC) analysis in thin and thick a-Si:H $n^+ - i - n^+$ structure. For that purpose, the problem of applicability of SCLC measurements to $n^+ - i - n^+$ a-Si:H samples are investigated by using both the thin (0.3 μ m) and thick (3 μ m) samples. The simulation results show that activation energy in thick samples is larger than in thinner samples, which are an agreement with the experimental results. It is emphasized that this method is highly useful for good quality a-Si:H samples, even if it is a thin sample, and den Boer analysis gives correct information about the density of states. This information comes from the states in the upper limited part of the gap, as exhibited by the lower activation energy of thin samples.

Key Words: AMPS-1D, Hydrogenated amorphous silicon, $n^+ - i - n^+$ structure, SCLC, activation energy

Turk. J. Phys., **28**, (2004), 31-40.

Full text: [pdf](#)

Other articles published in the same issue: [Turk. J. Phys., vol.28, iss.1.](#)