Presentation on:
Schottky contact analysis of photovoltaic chalcopyrite thin film absorbers

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Condensed Matter Journal Club

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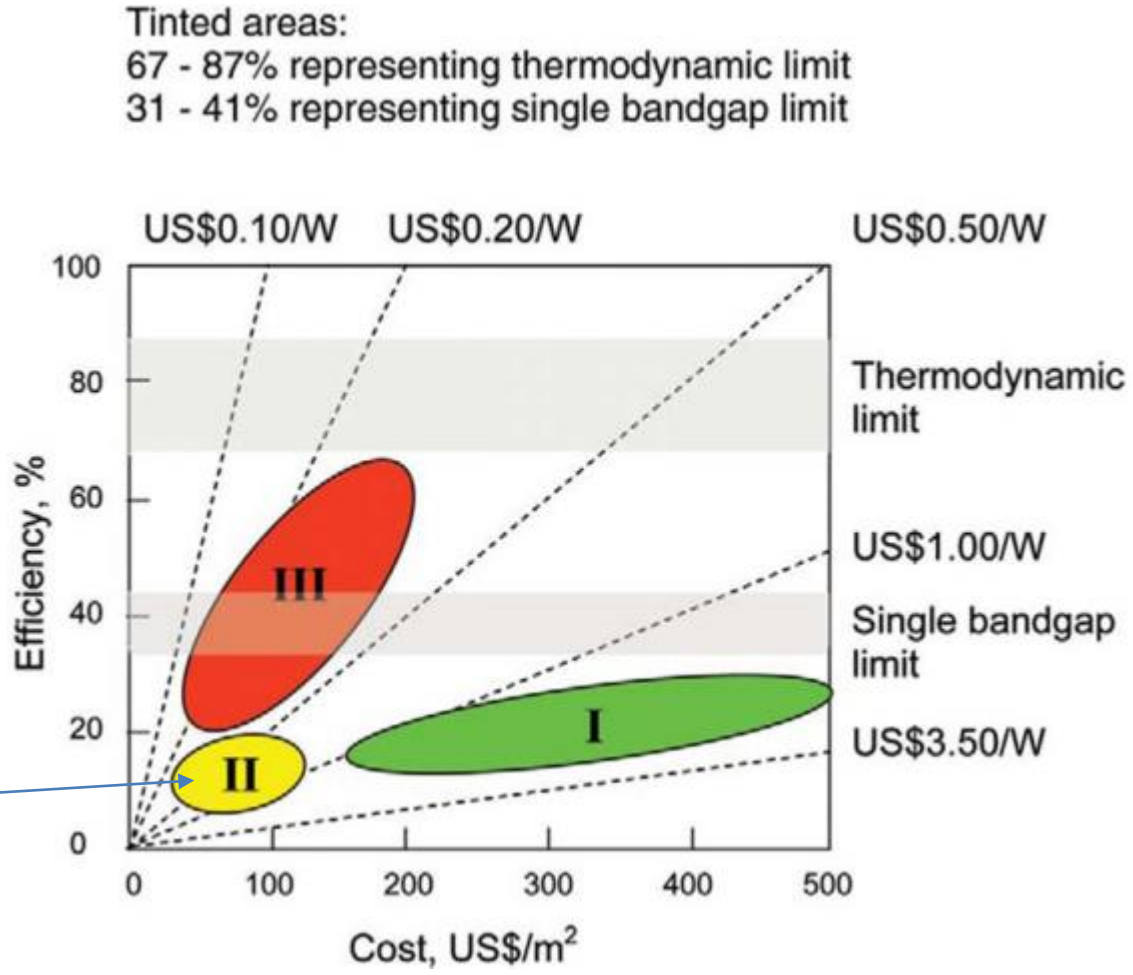
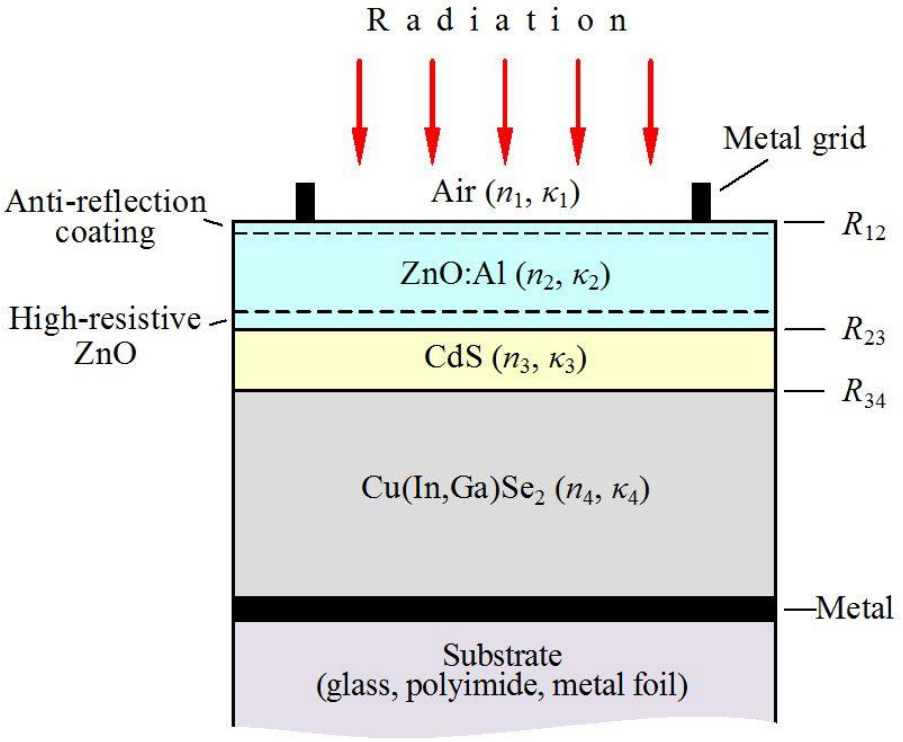
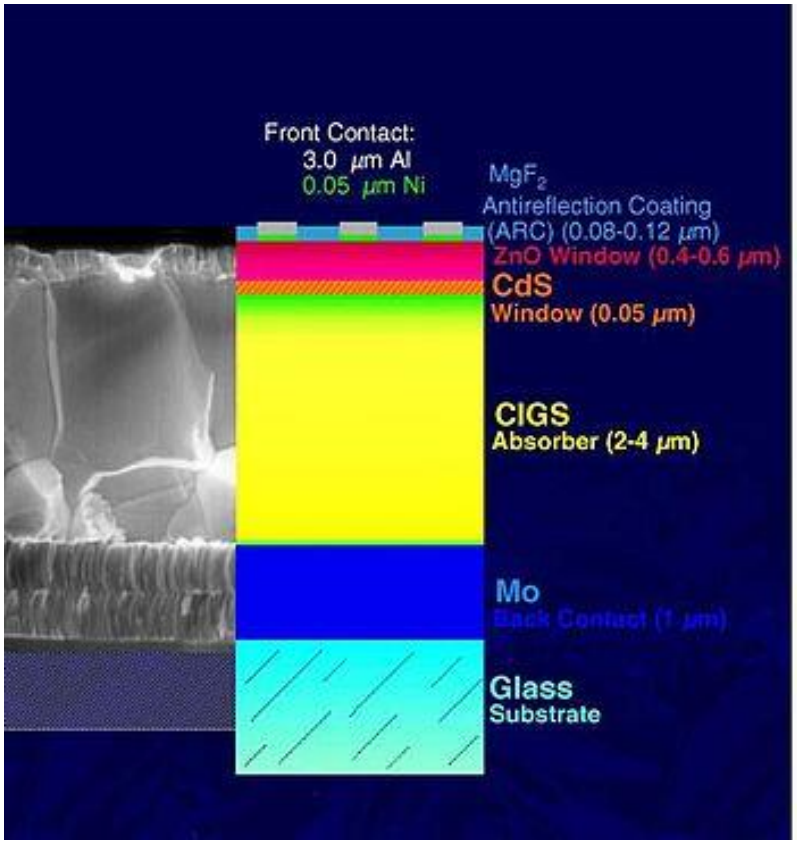


G. Conibeer, 2007 Third-generation photovoltaics Material Today 10 11 44 50

$Cu(In,Ga)Se_2$ Solar Cells

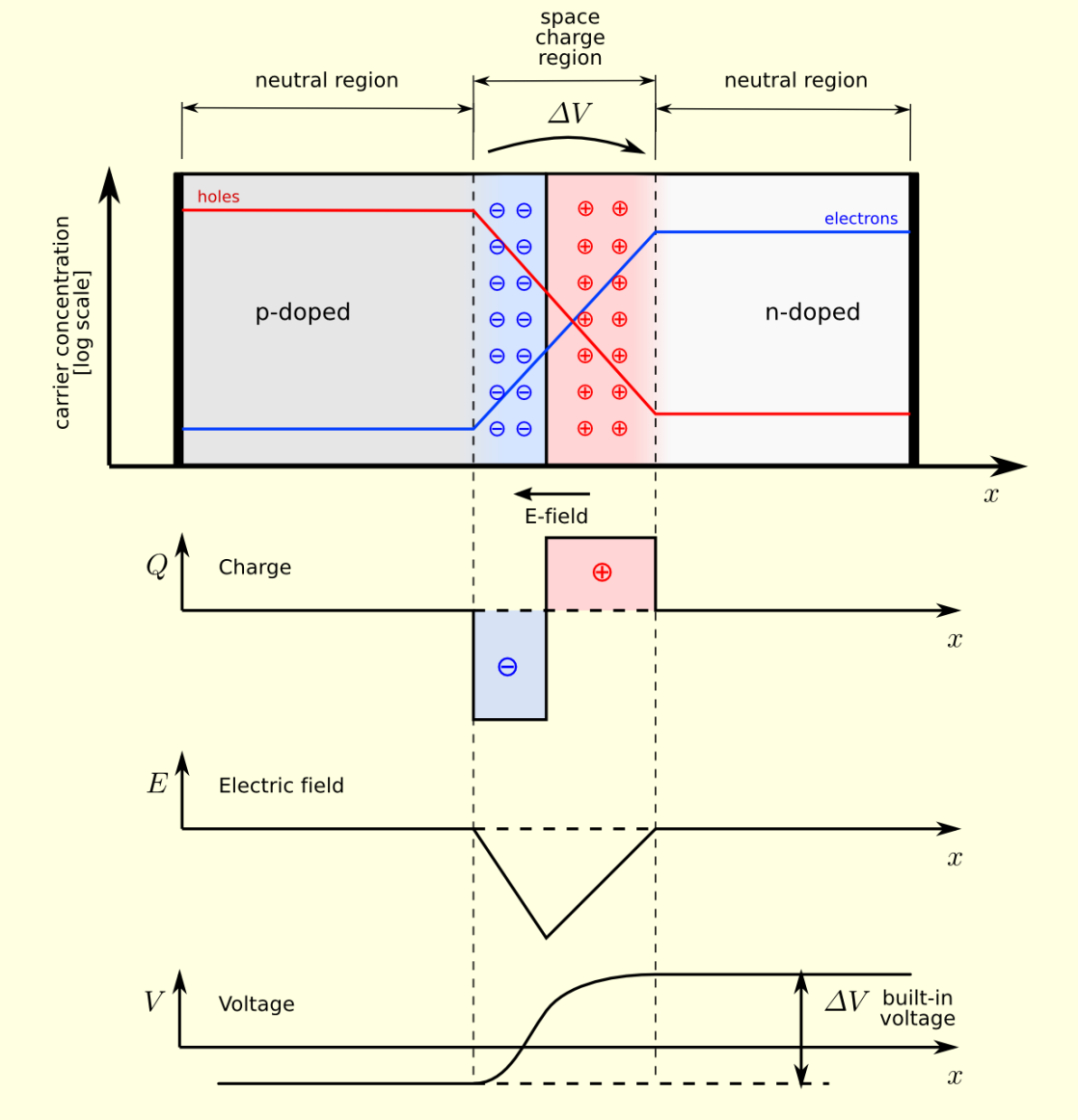




Leonid A. Kosyachenko, A Theoretical Description of Thin-Film Cu(In,Ga)Se2 Solar Cell Performance. (2015).

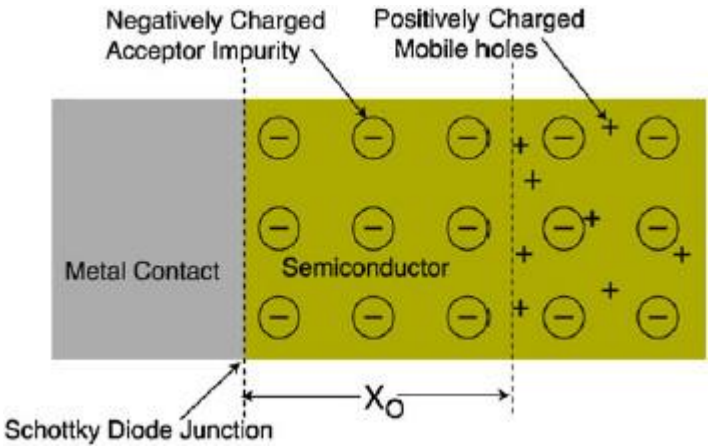
L. Kazmerski, NREL, 2005

Depletion Region



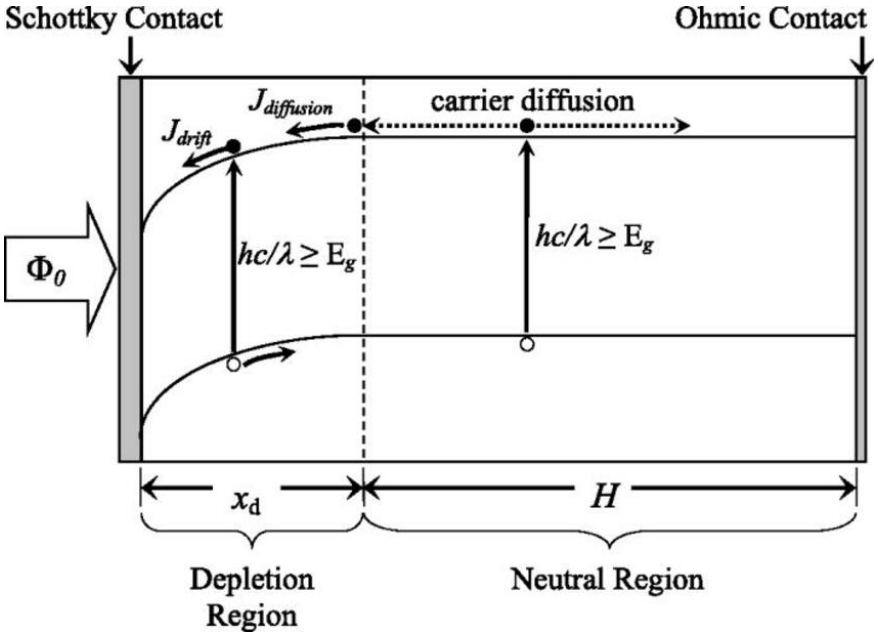
https://en.wikipedia.org/wiki/Depletion_region

Schottky Diode

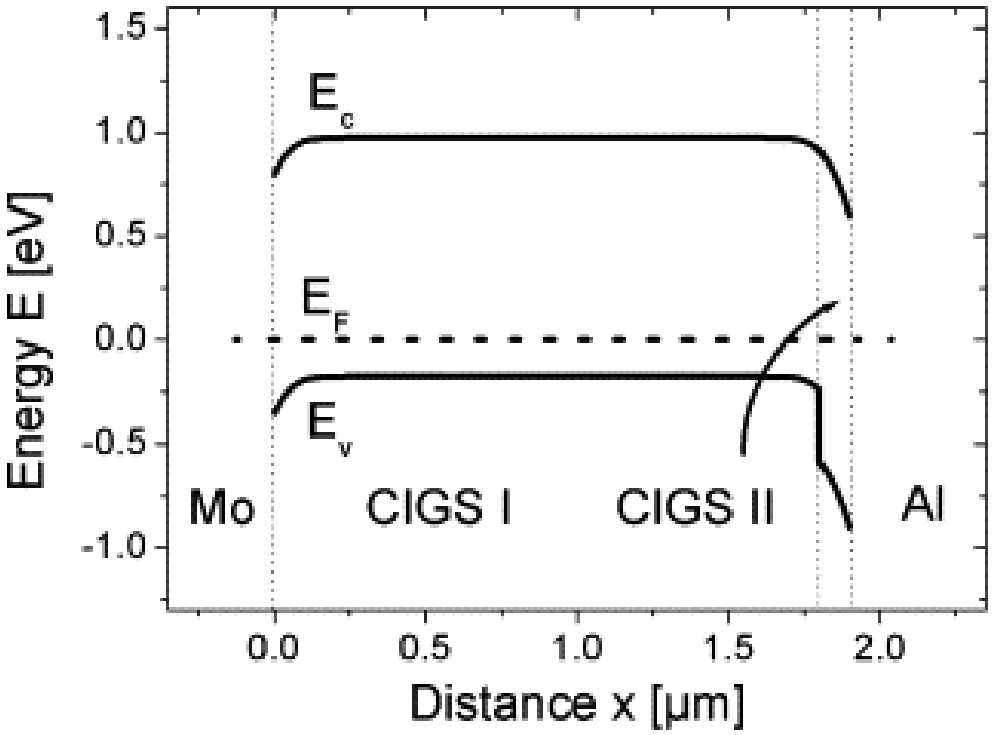


An example schematic of a Schottky diode formed with a metal and P-type semiconductor.

J E Butler *et al* 2003 *Semicond. Sci. Technol.* **18** S67

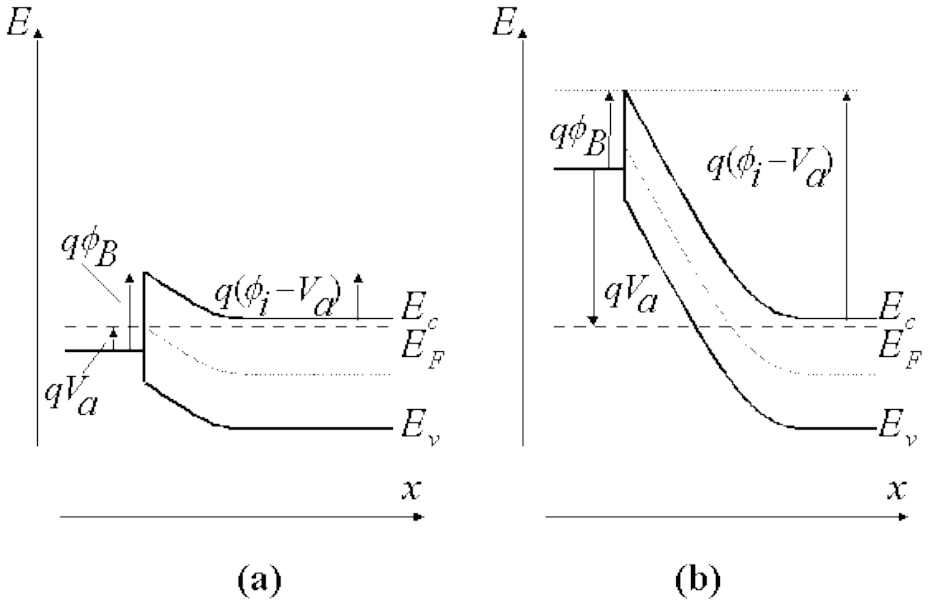


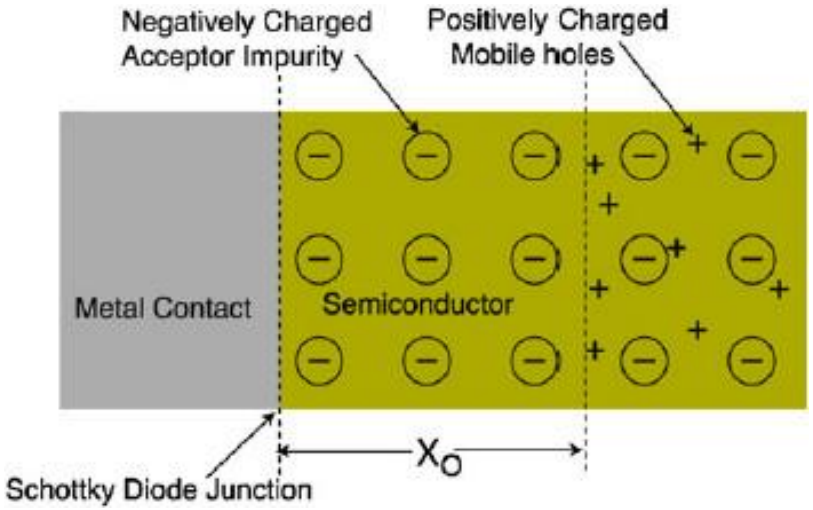
D. Wee *et al* 2012 *J. Appl. Phys.* 112, 044501



Like the figure from the previous slide, our material is P-type, and we have this type of Schottky contact with Aluminum

Applying a voltage

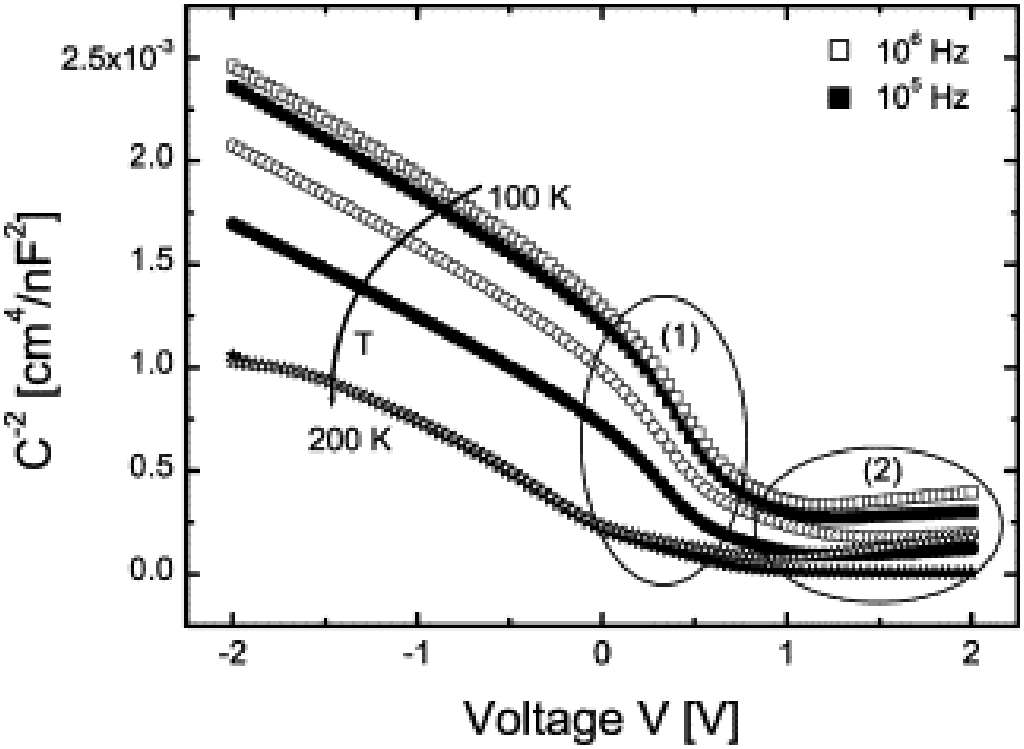


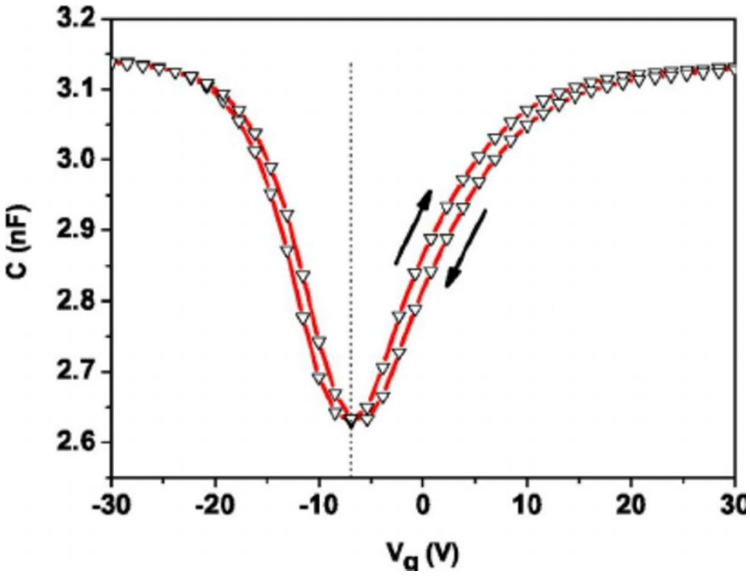


J E Butler *et al* 2003 *Semicond. Sci. Technol.* **18** S67

http://ecee.colorado.edu/~bart/book/book/chapter3/ch3_2.htm#fig3_2_1

Results

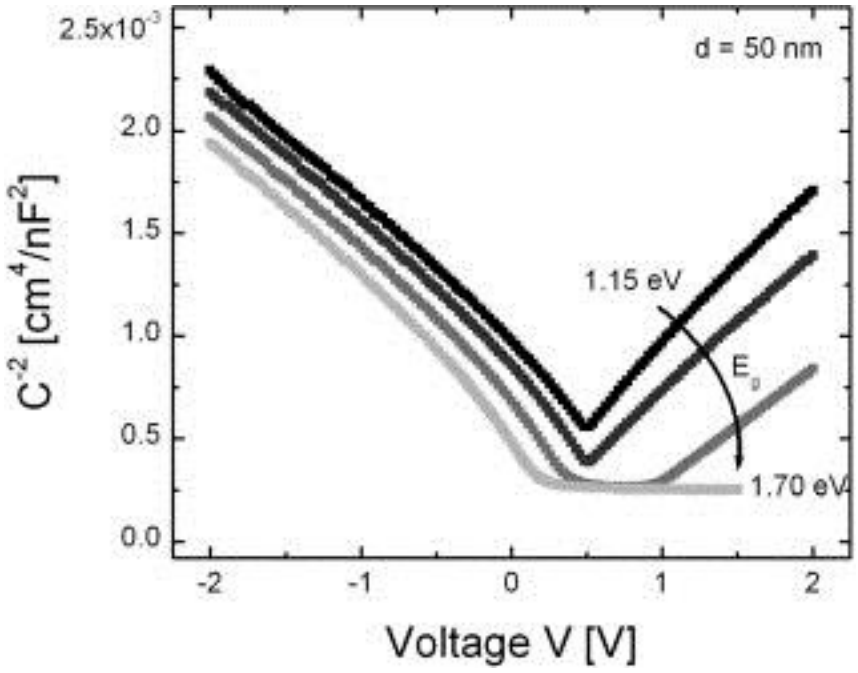


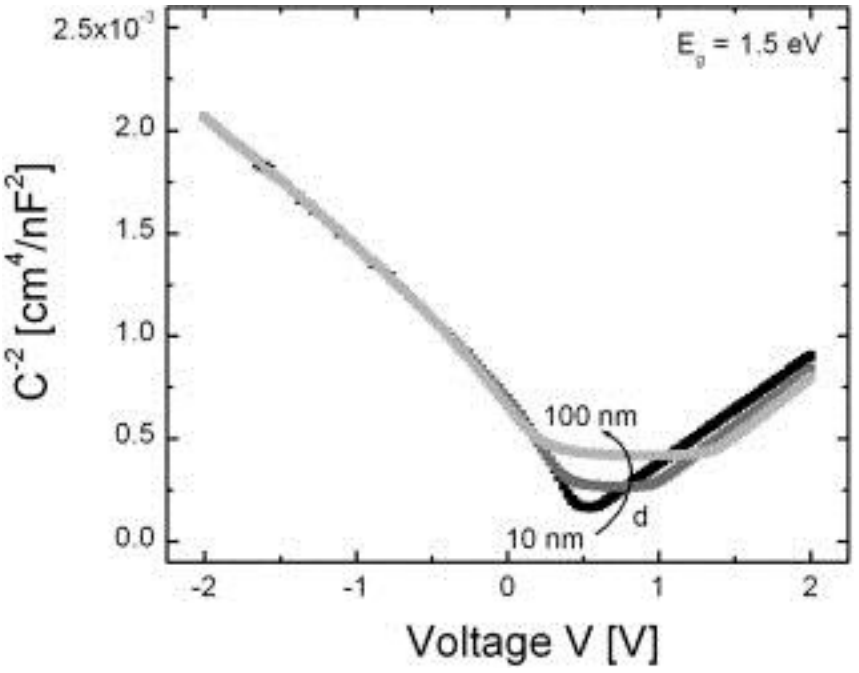


Capacitance of a MIS diode

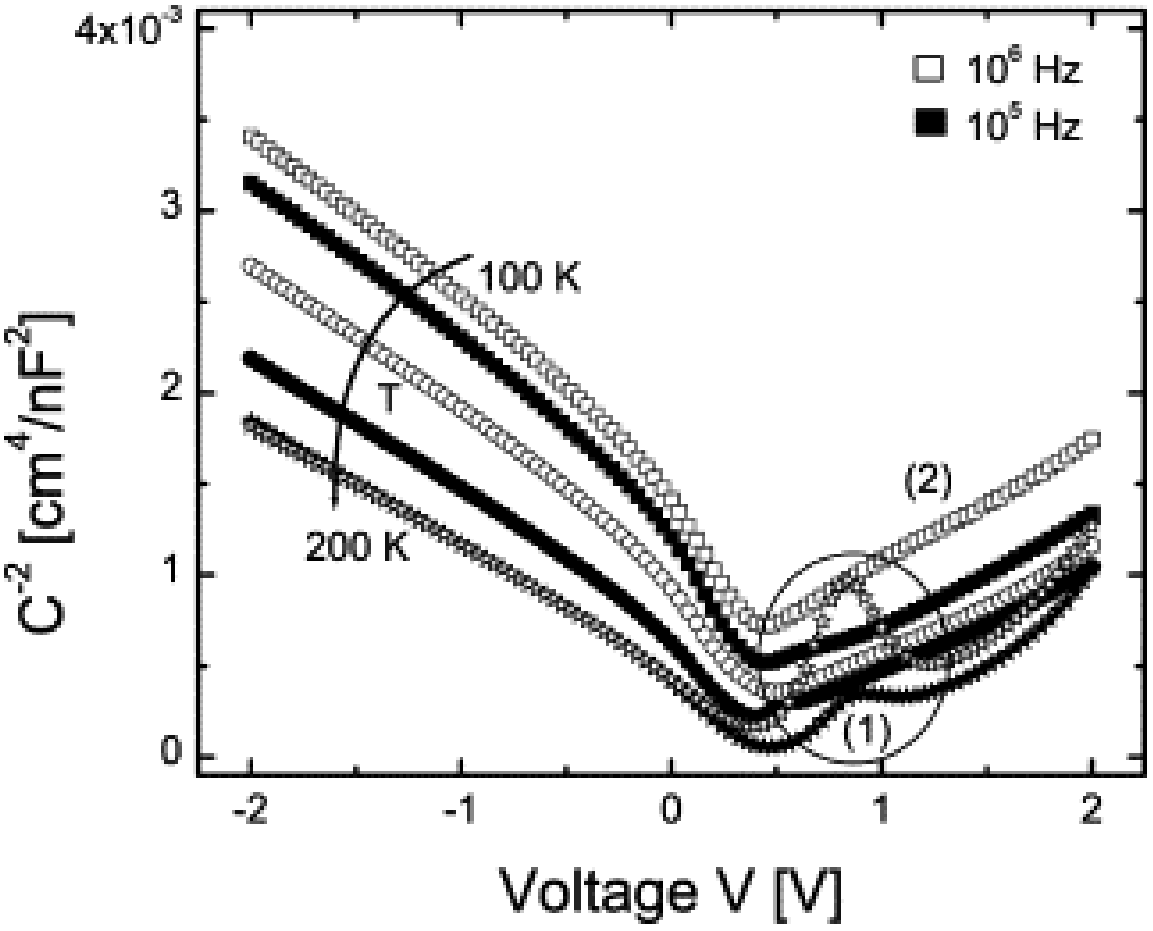
E. Smits *et al* 2006 *Phys. Rev. B* 73 (20)

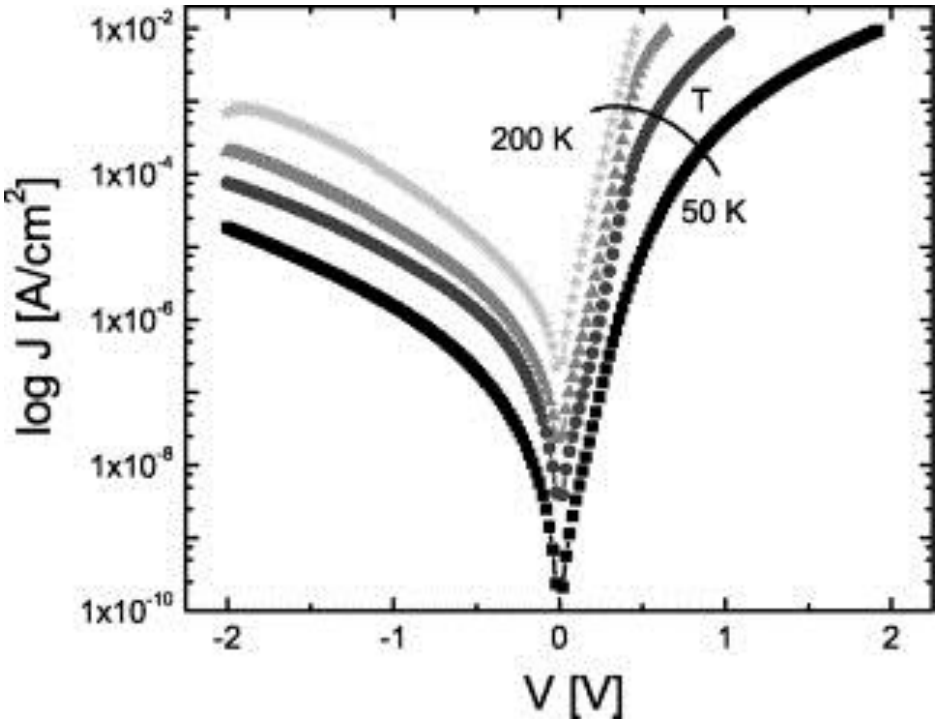
Simulations

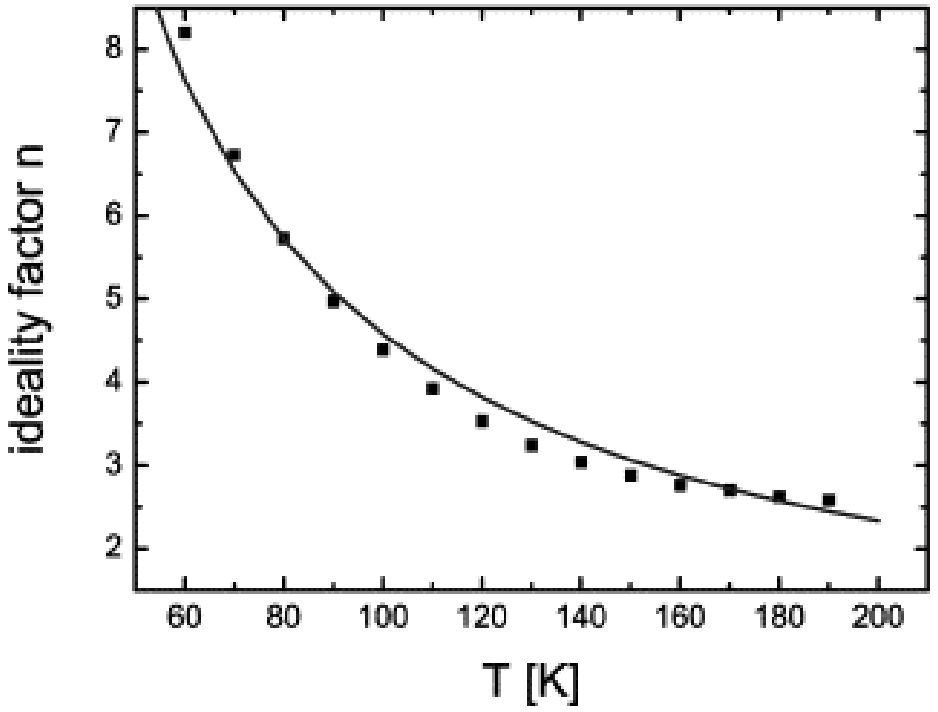




Removal of Dielectric layer




1x10-2
1x10-4
1x10-6
1x10-8
1x10-10
log J [A/cm2]
200 K
T
50 K
-2
-1
0
1
2
V [V]


ideality factor n
8
7
6
5
4
3
2
60
80
100
120
140
160
180
200
T [K]