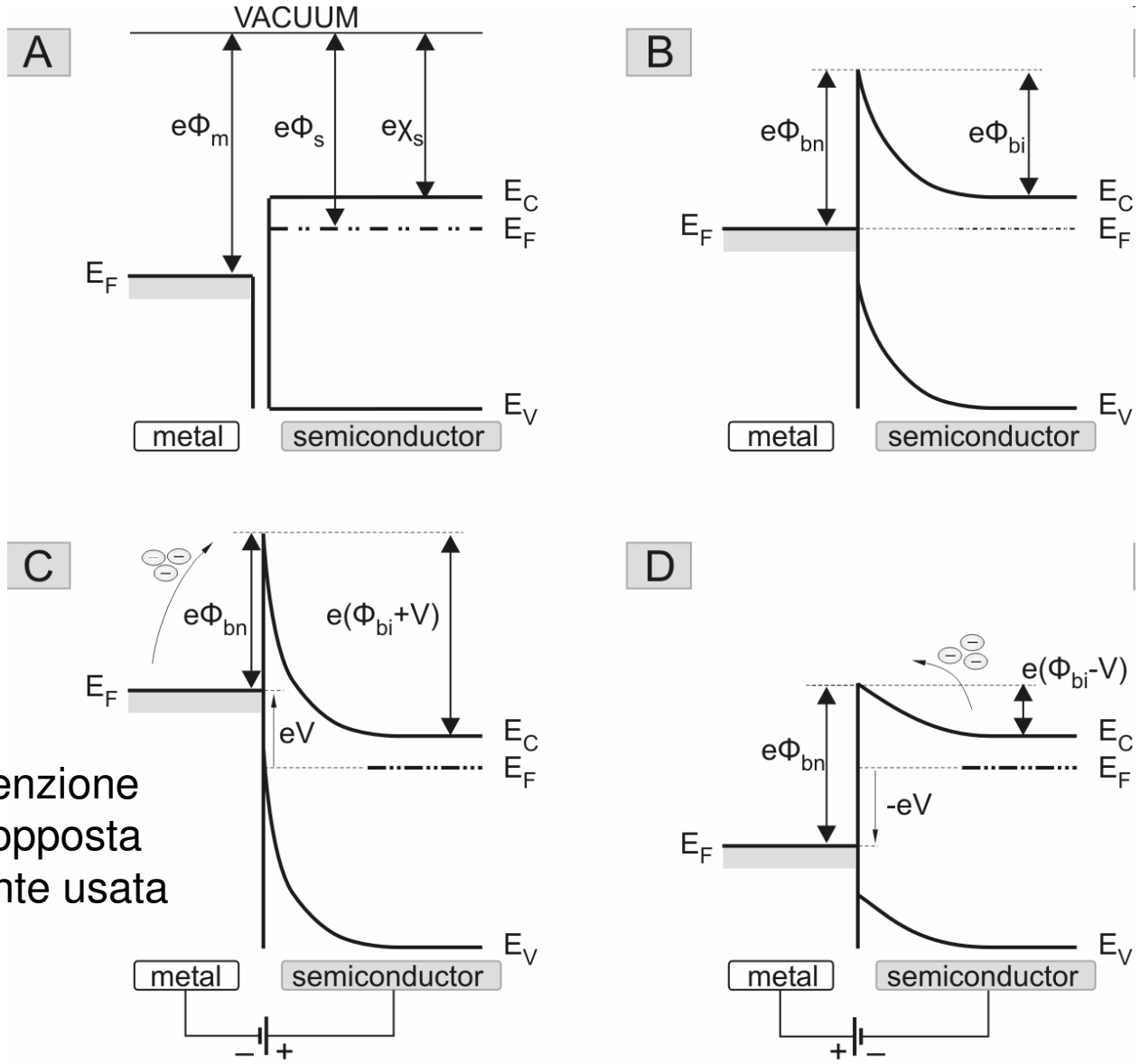
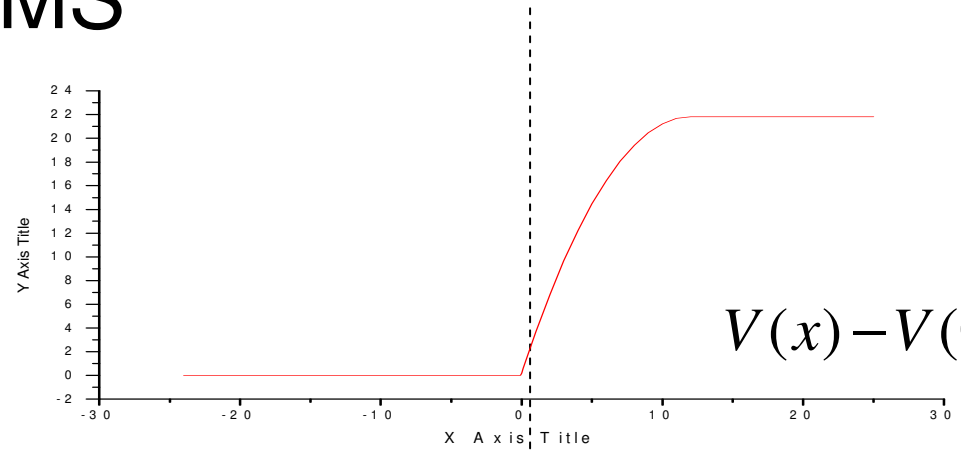
Giunzione MS

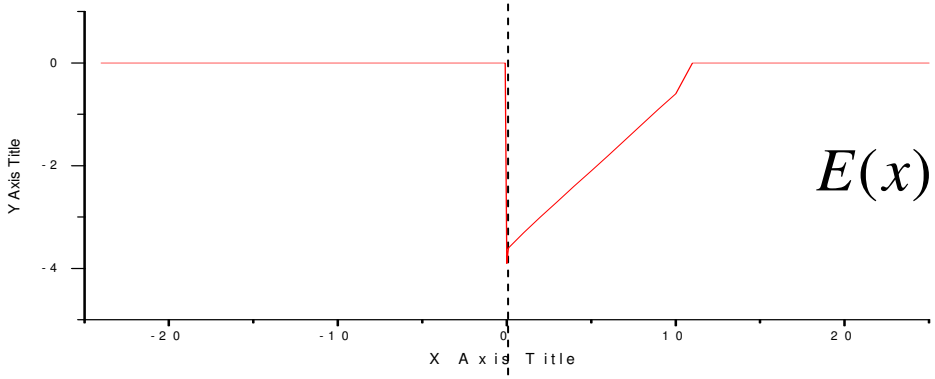


Nota: qui la convenzione del segno di V è opposta a quella solitamente usata

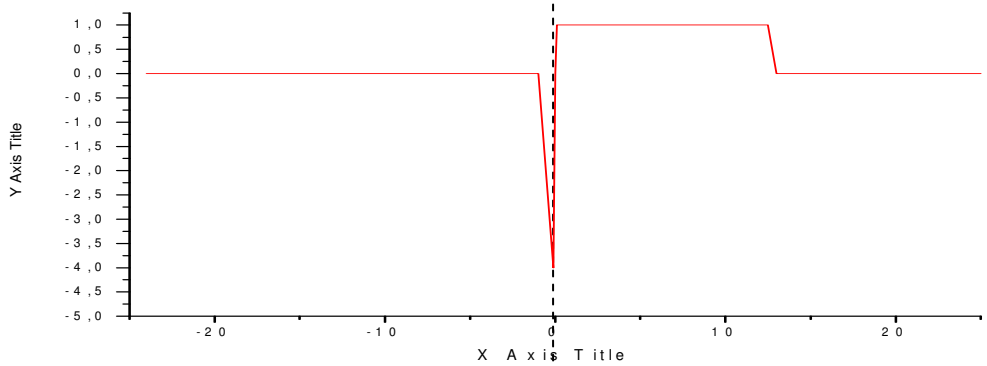
Giunzione MS



$$V(x) - V(0) = -\int_0^x E(x')dx'$$



$$E(x) = -\frac{1}{\varepsilon}\int_x^W \rho(x')dx'$$

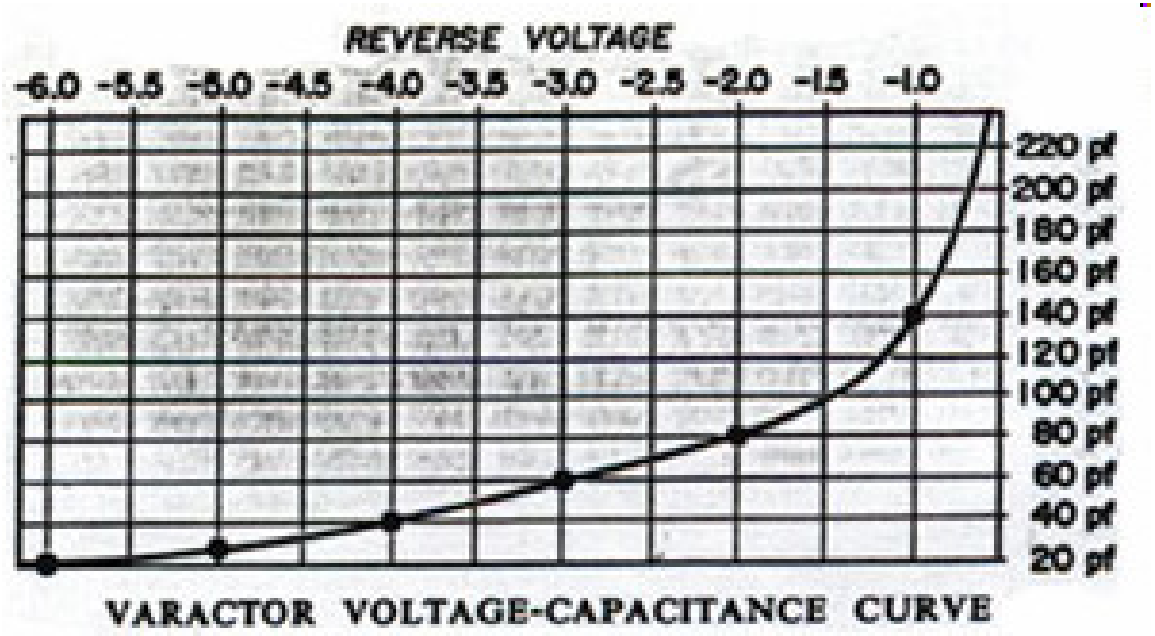


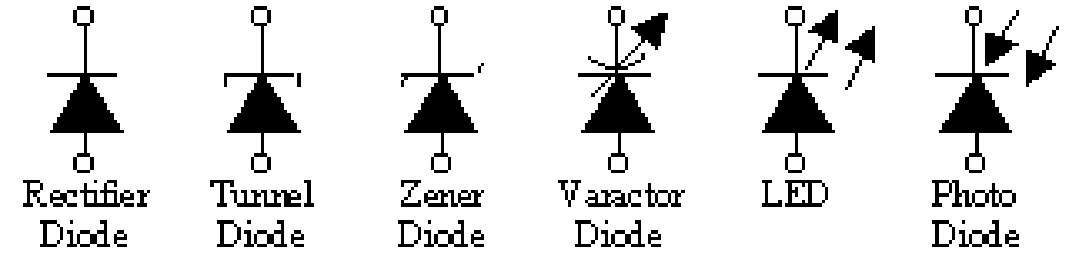
$$\rho(x) = \varepsilon\frac{dE}{dx}$$

W

Varactor

$$C(V) = \sqrt{\frac{e\varepsilon N_D}{2(\Phi_{bi} - V)}} S$$





Calcolo barriera potenziale

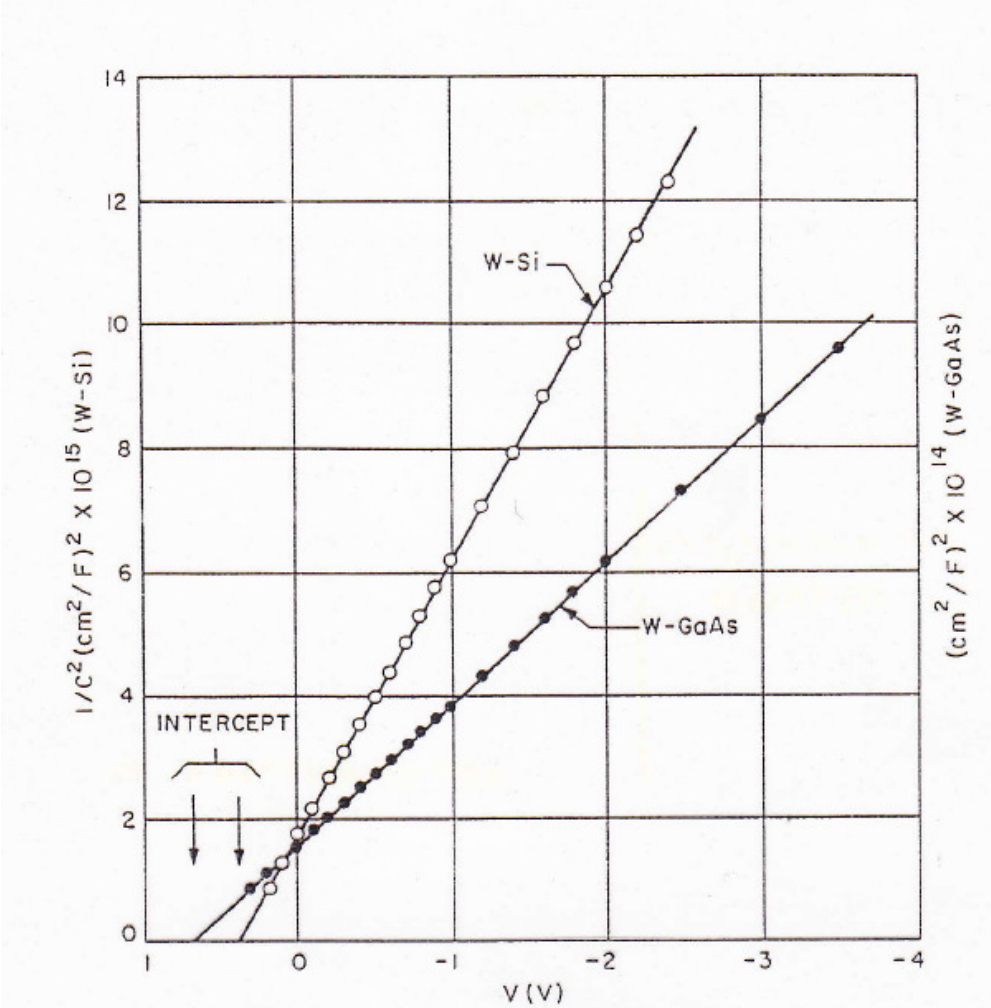


Fig. 5 $1/C^2$ versus applied voltage for W–Si and W–GaAs diode.[3]

$$\frac{1}{C^2} = \frac{2(\Phi_{bi} - V)}{e\varepsilon N_D}$$

$$\frac{1}{C^2(V=0)} = \frac{2\Phi_{bi}}{e\varepsilon N_D} = 1.8\,10^7 \frac{m^4}{F^2}$$

$$\Phi_{bi} = 0.4V$$

$$N_D = \frac{2V_{bi}C^2(0)}{e\varepsilon} = 2.5\,10^{21} m^{-3}$$

$$E_C - E_F = KT \ln\left(\frac{N_C}{N_D}\right) = 0.25\,eV$$

$$\Phi_{bn} = \Phi_{bi} + \frac{E_C - E_F}{q} = 0.65\,eV$$

Vari metalli

$$\Phi_{bn} = \Phi_m - \chi_s$$

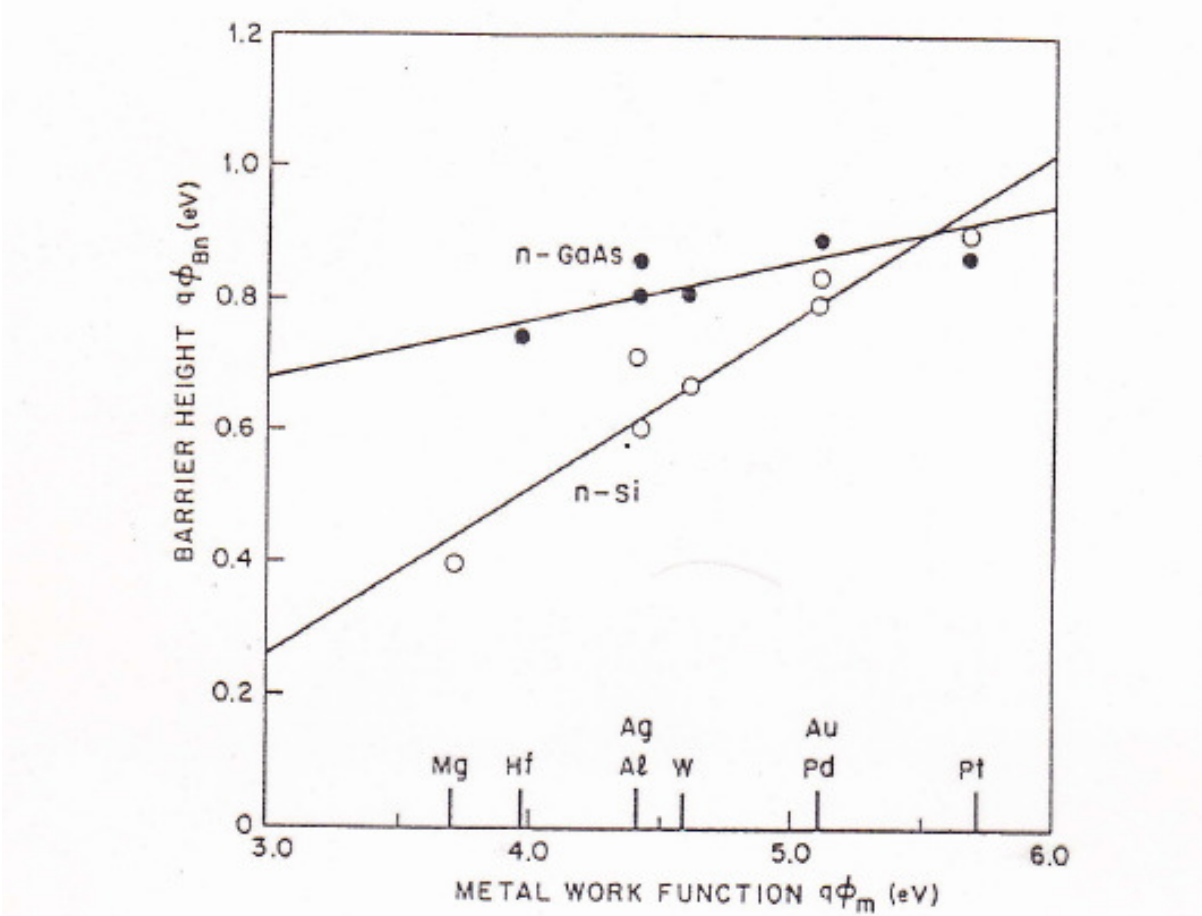
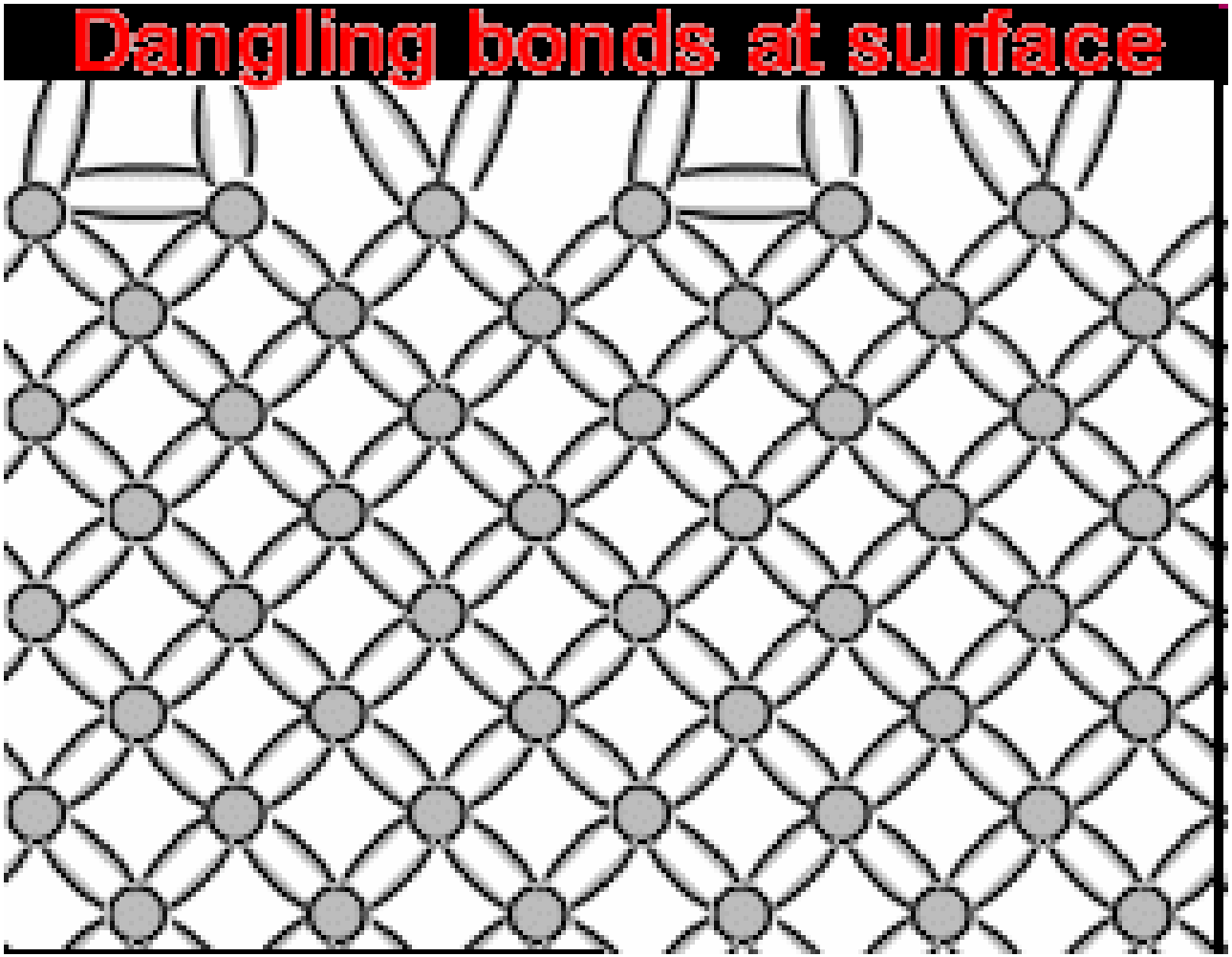
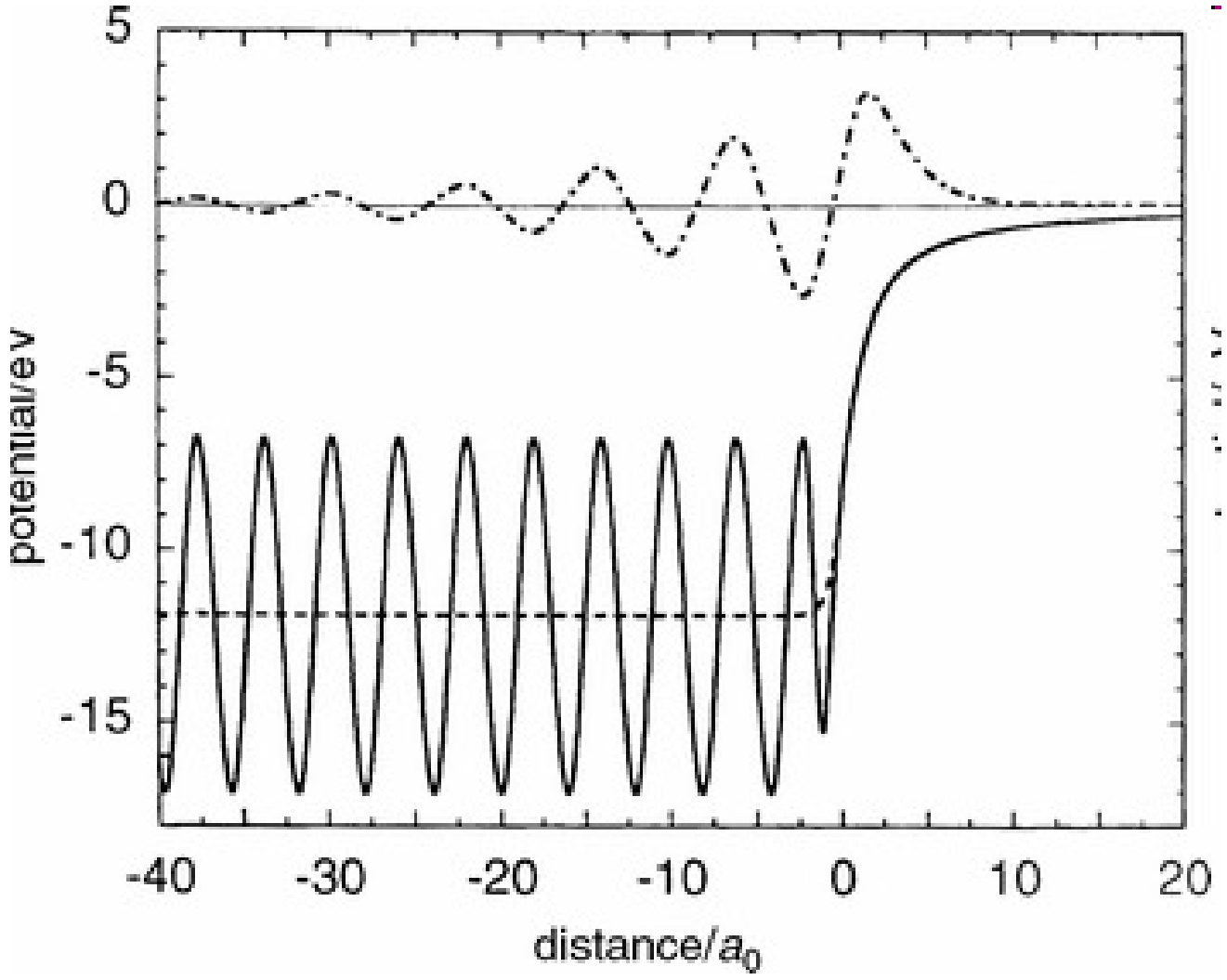


Fig. 3 Measured barrier height for metal-silicon and metal-gallium arsenide contacts.[2]

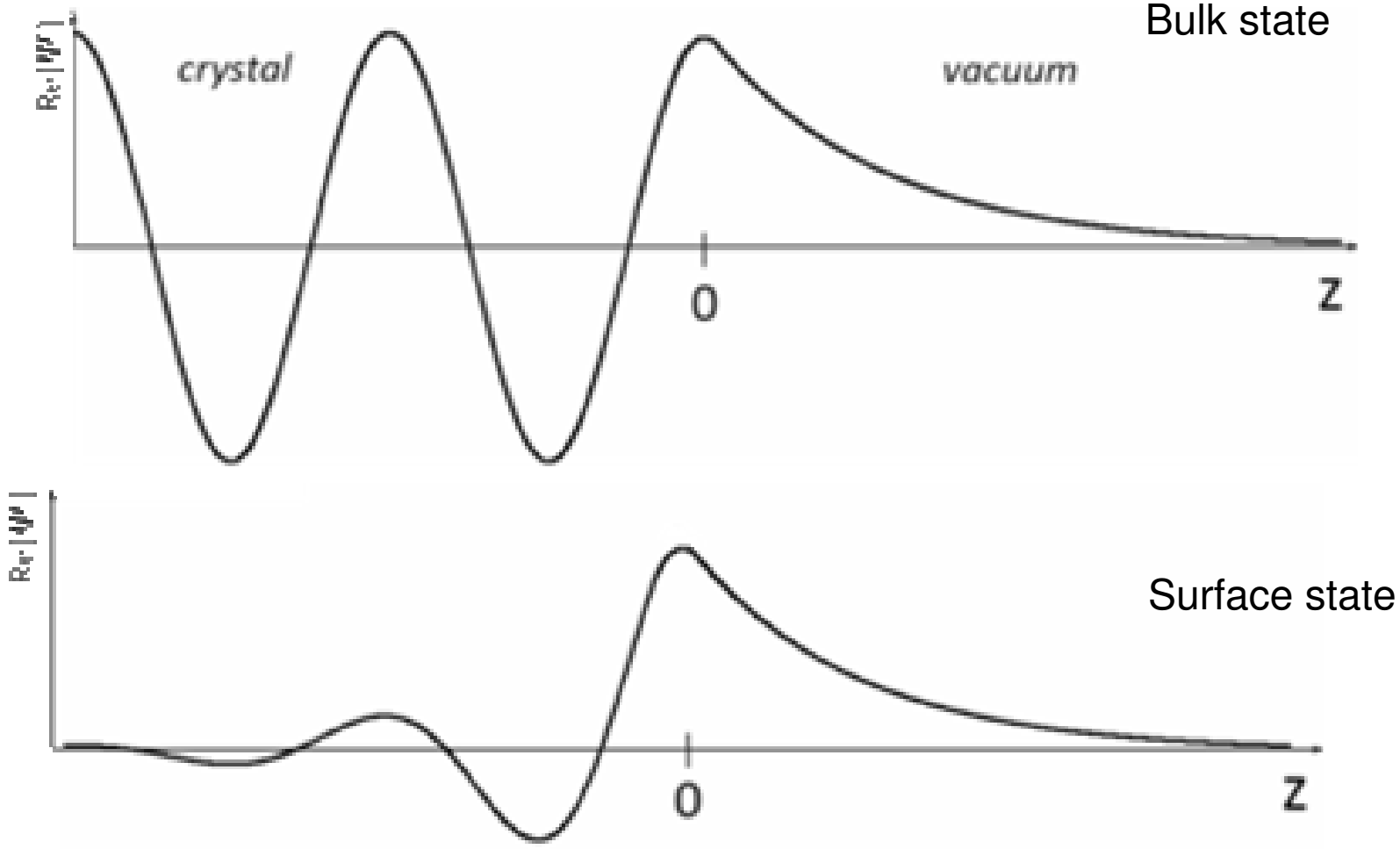
Superficie



Superficie



Stati di superficie



Stati di superficie e band bending

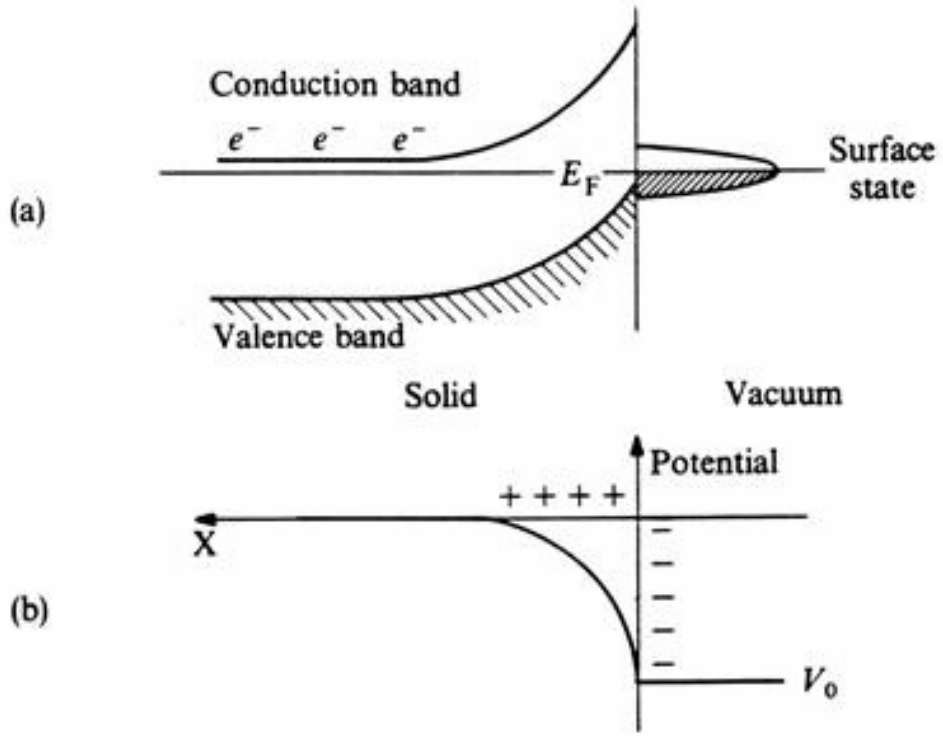


Fig. 7.24 Band bending due to a surface state on a n-type semiconductor. (a) Band energies and Fermi level, showing surface state. (b) Charge distribution and variation of electrostatic potential.

Stati di superficie e band bending

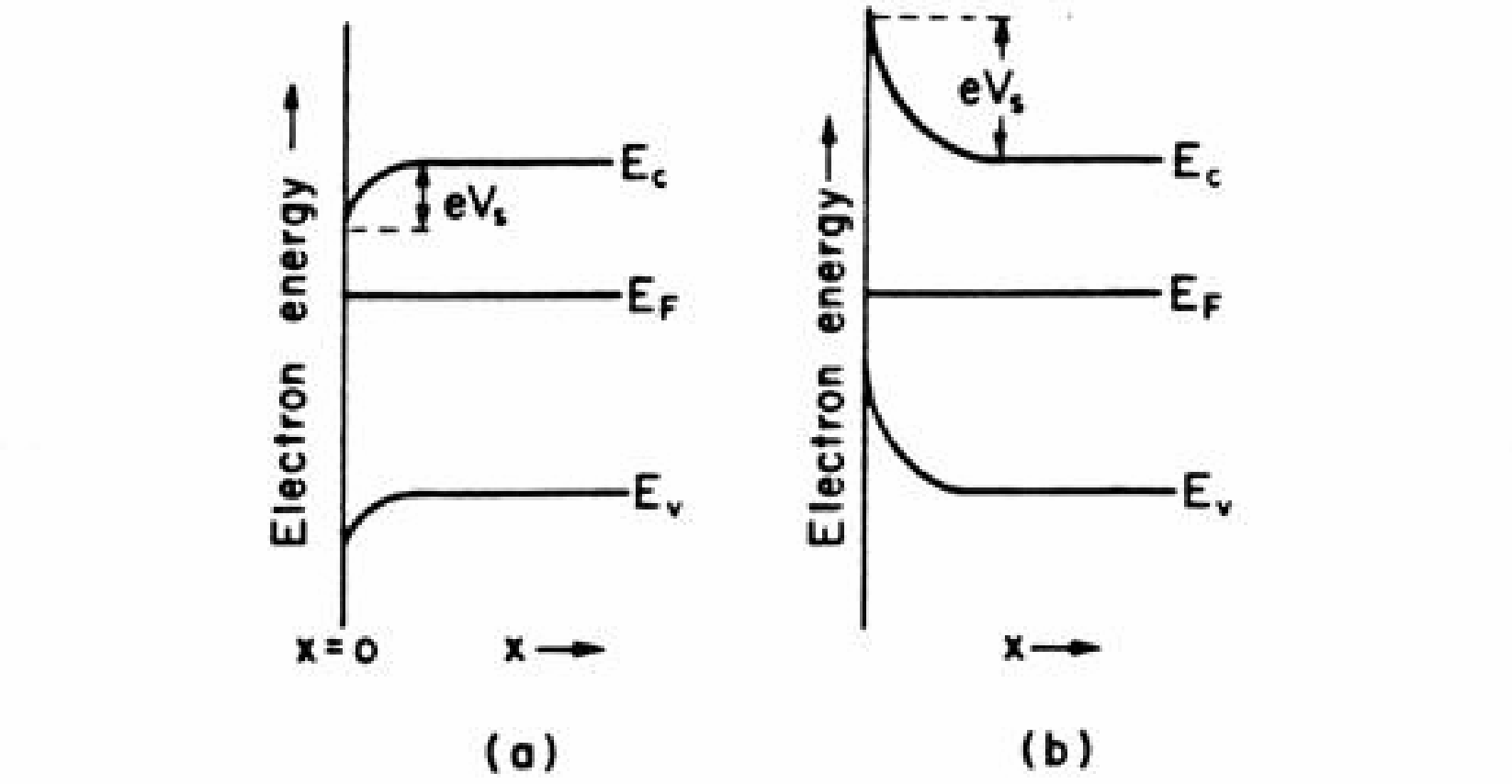
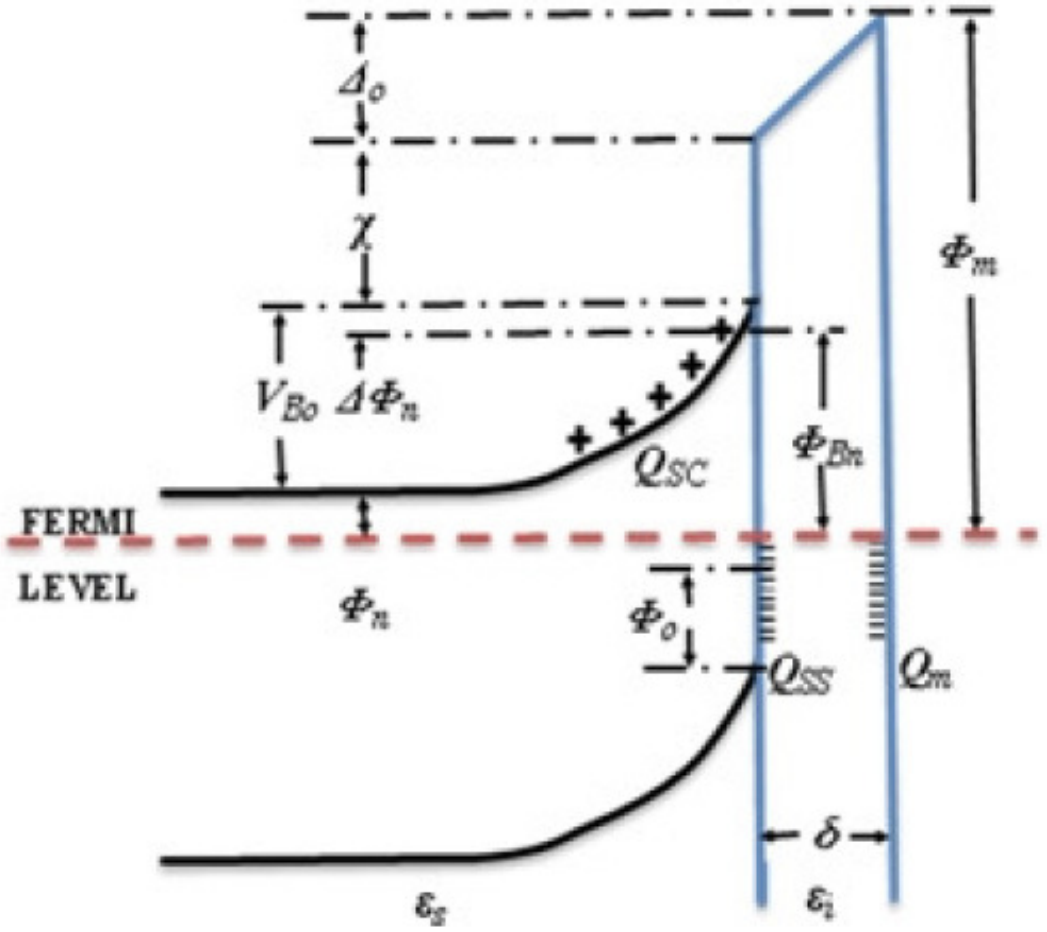


Figure 4.19. *Energy-level diagrams for an intrinsic semiconductor in the presence of (a) electron-donor or (b) electron-acceptor surface states.*

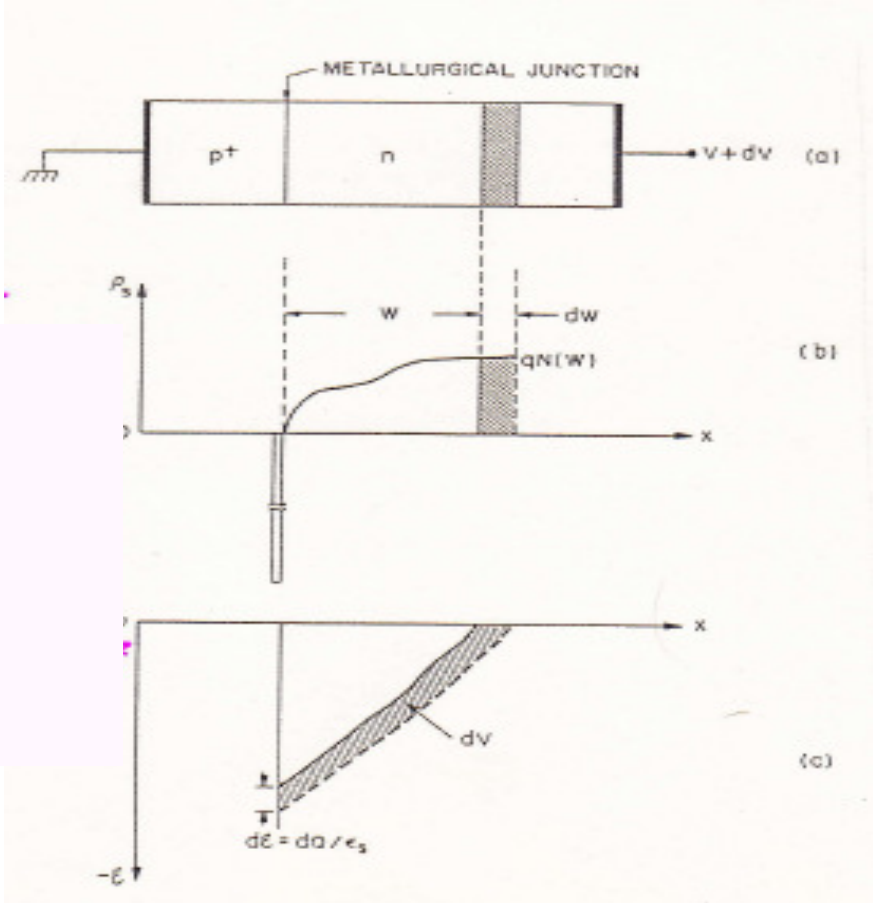
Stati di superficie e band bending



Cowley and Sze's

$$\phi_{Bn} = \gamma(\phi_m - \chi) + (1-\gamma)(E_g - \phi_0)$$

Metodo CV



Metodo CV

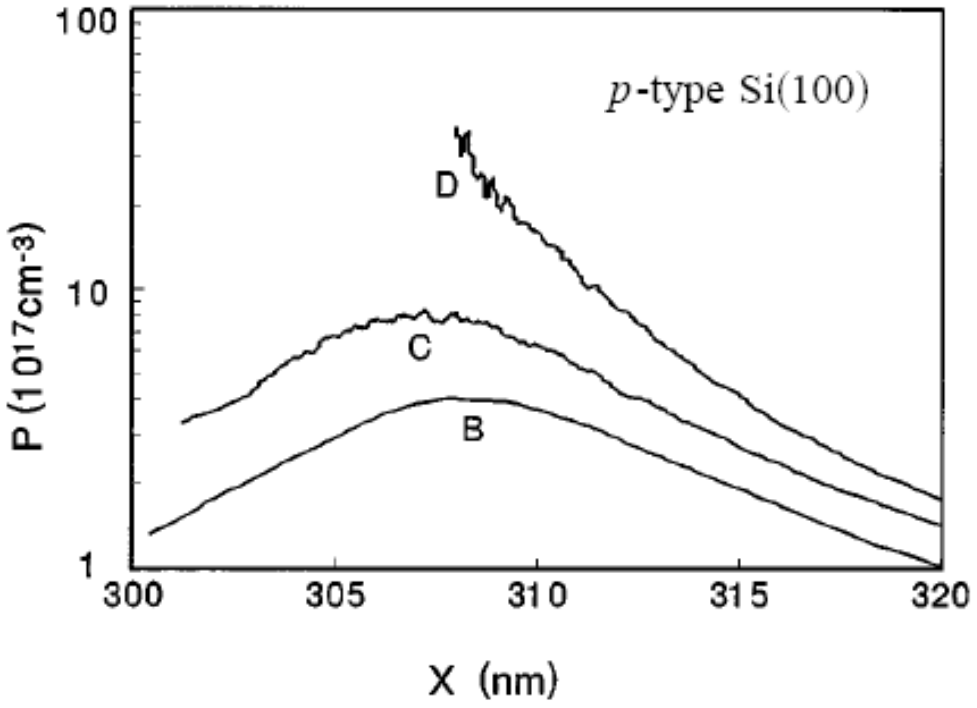


FIG. 10. The *C-V* carrier-concentration profiles of samples *B*, *C*, and *D*.