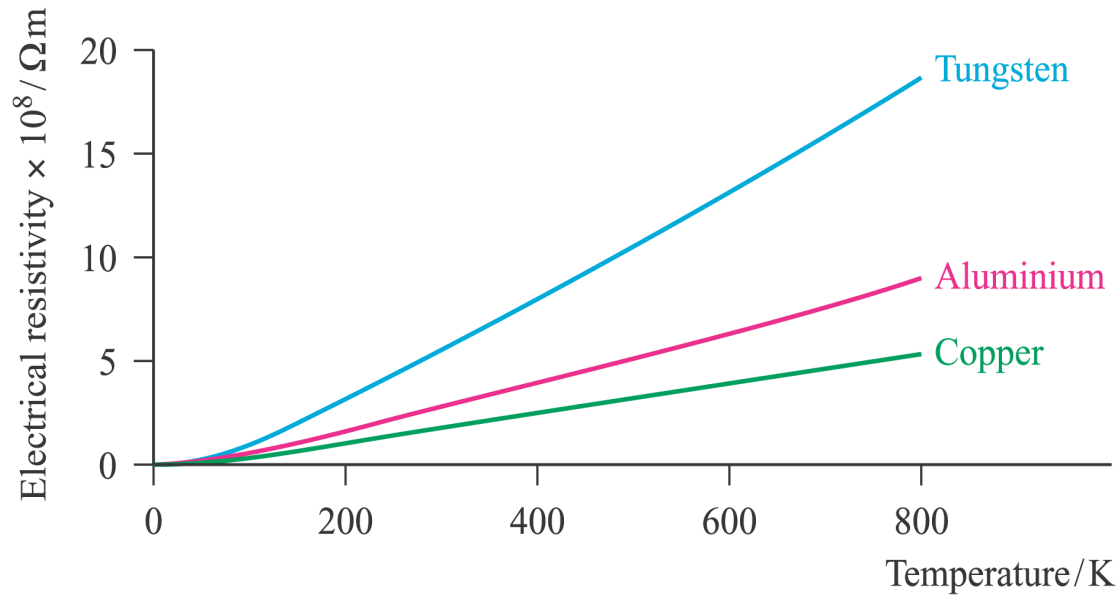
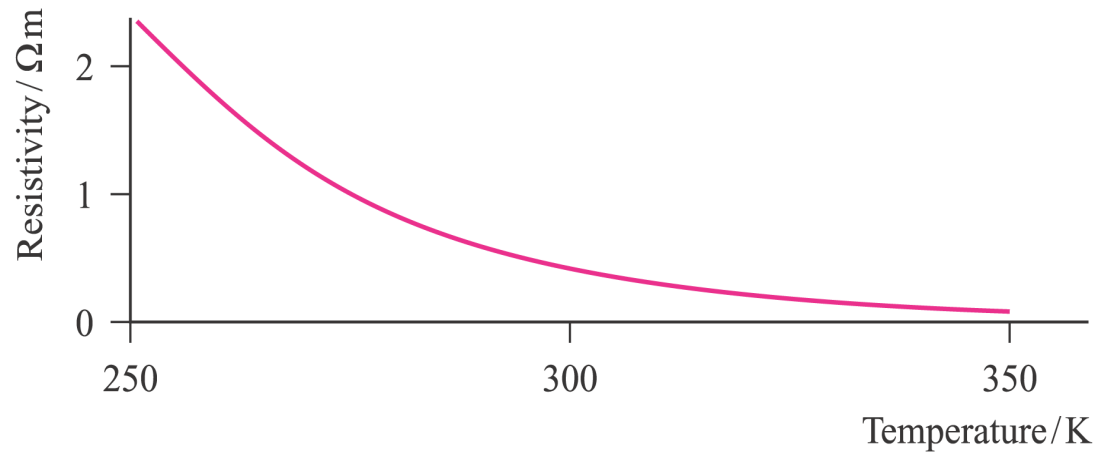
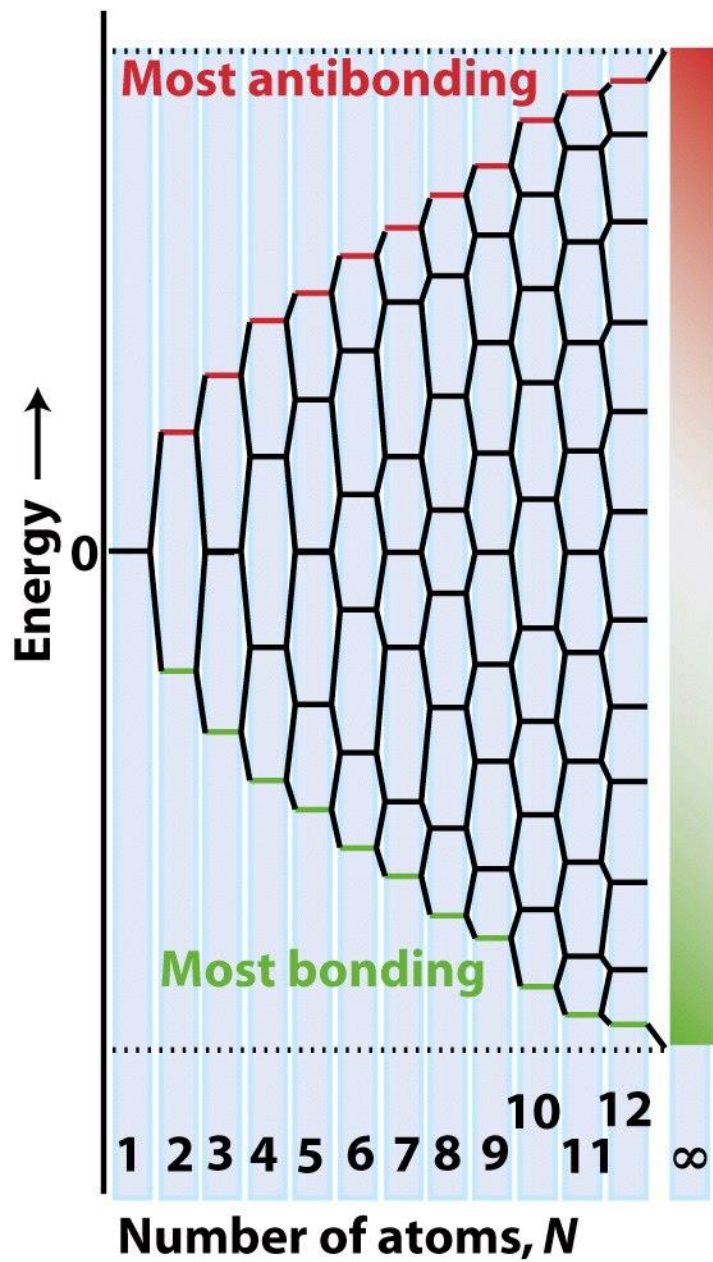


# Resistività di alcuni metalli in funzione della temperatura



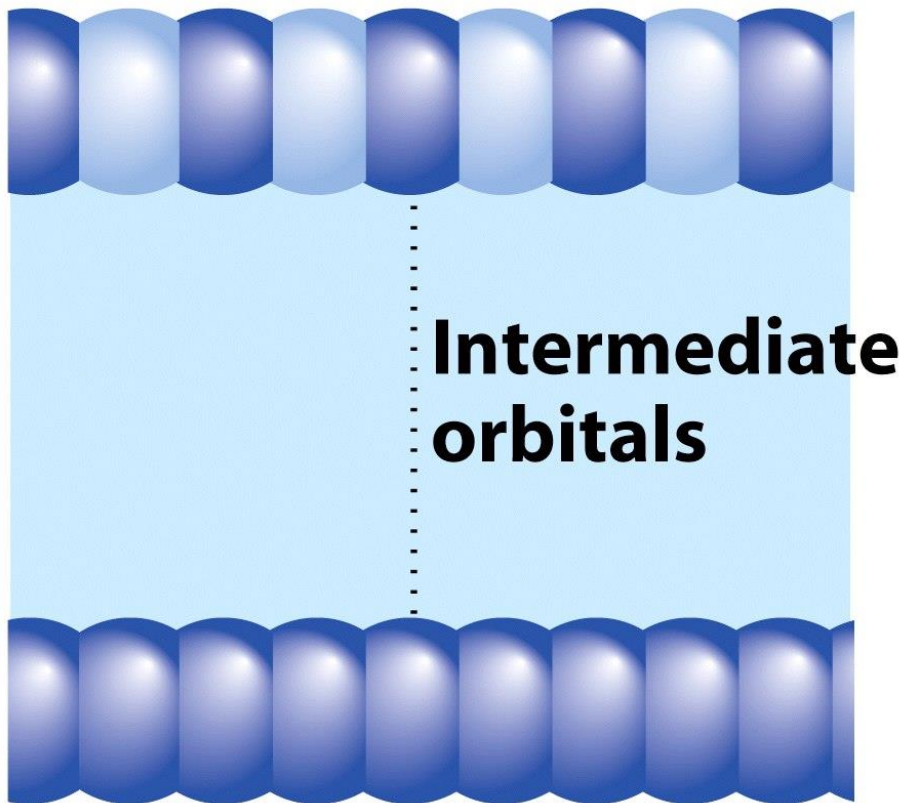
# Resistività del semiconduttore Ge in funzione della temperatura





## Banda s

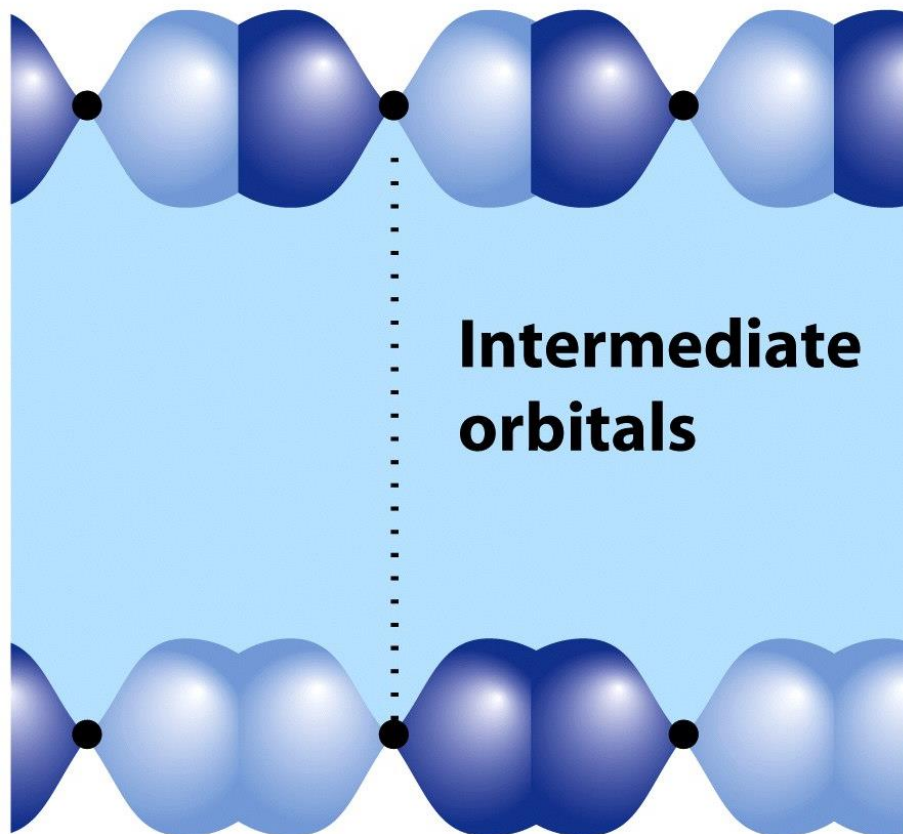
**Most antibonding**



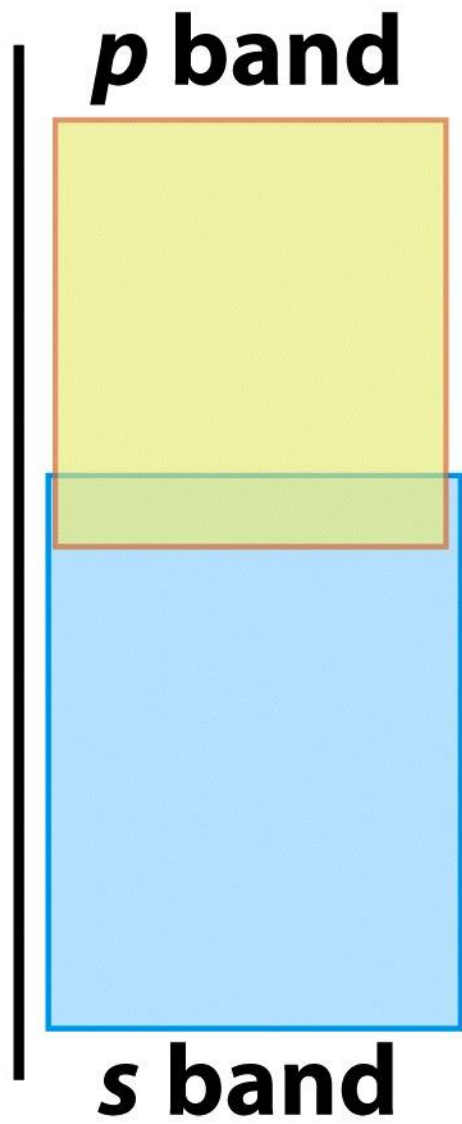
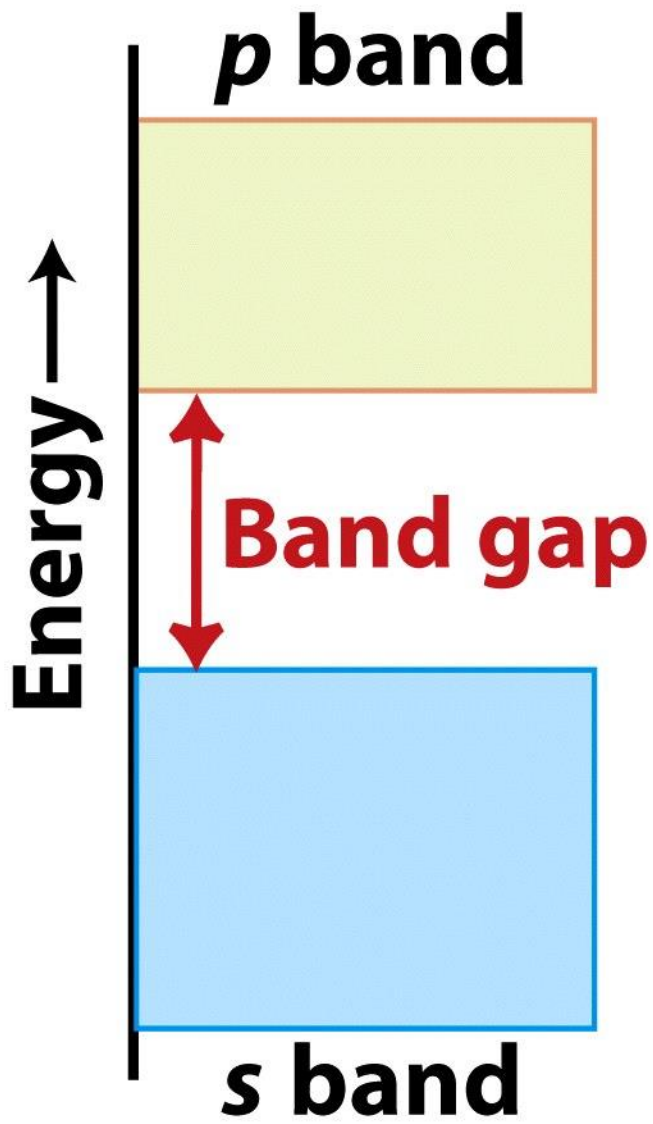
**Most bonding**

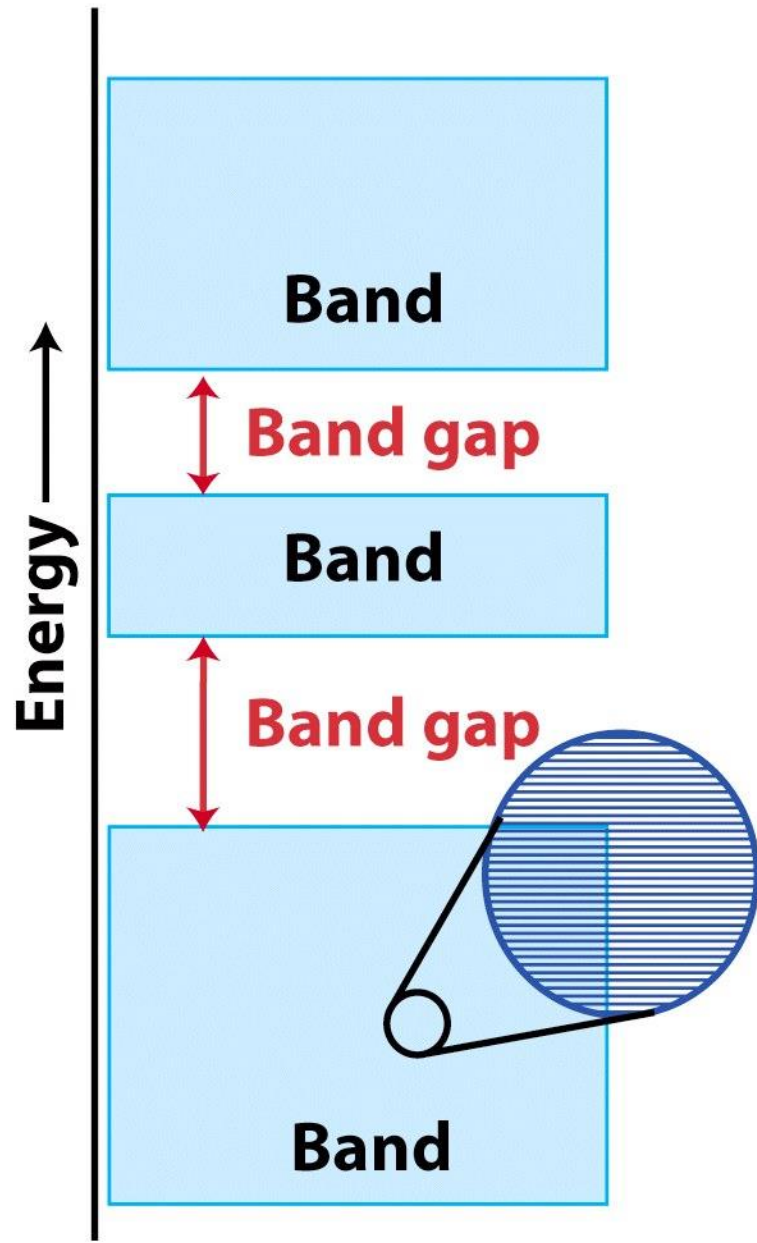
## Banda p

**Most antibonding**



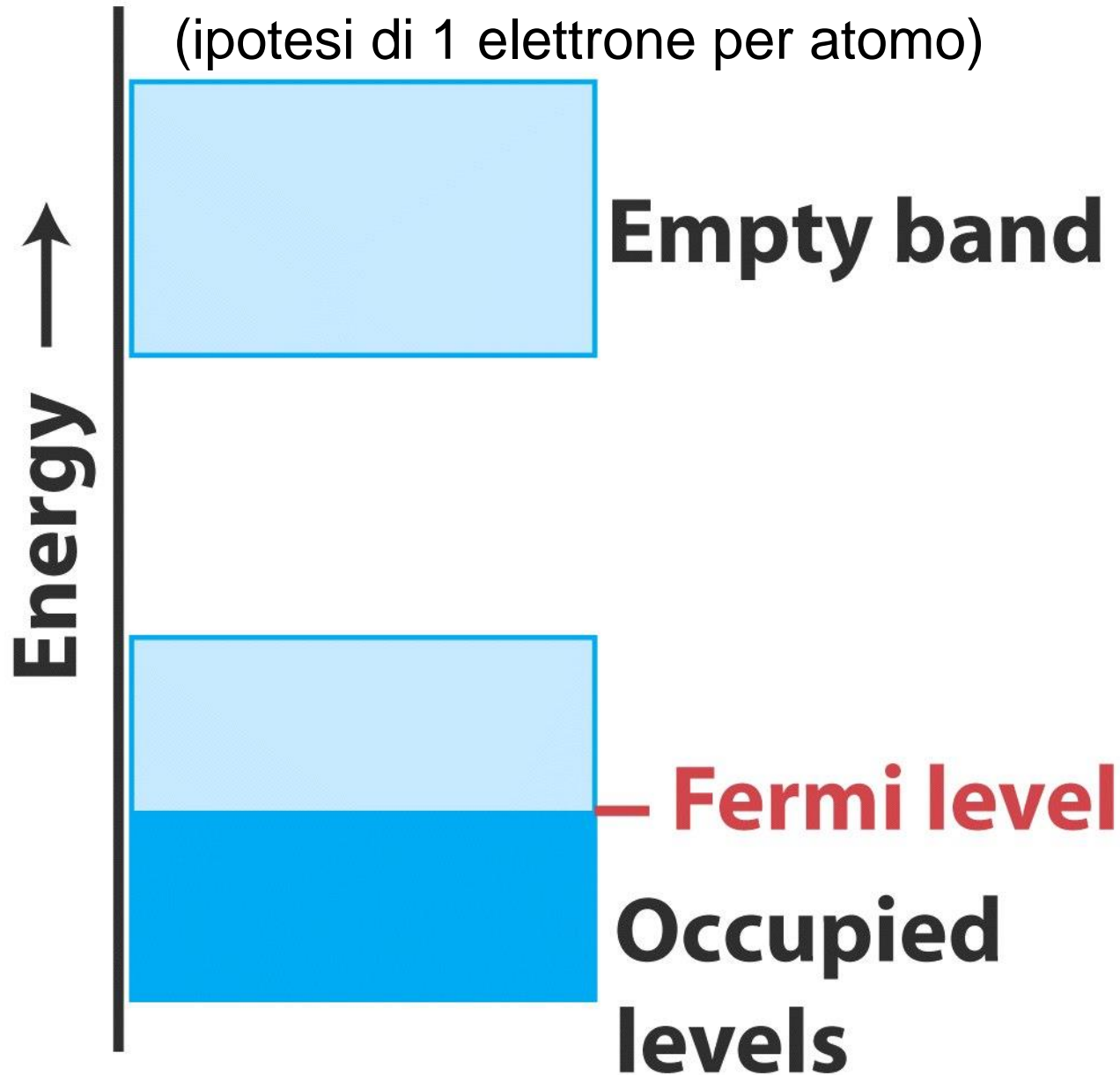
**Most bonding**





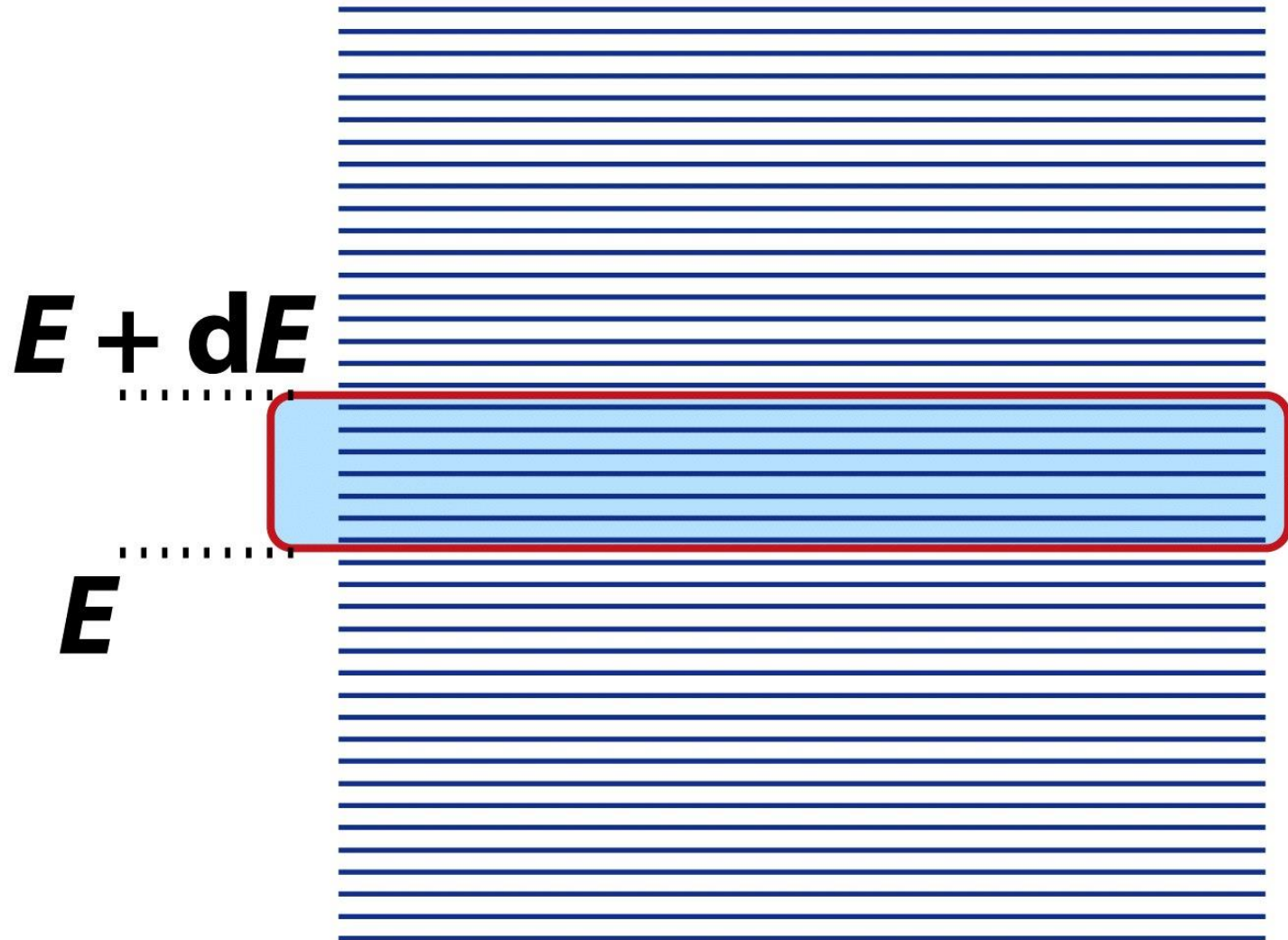
# Solido conduttore metallico

(ipotesi di 1 elettrone per atomo)

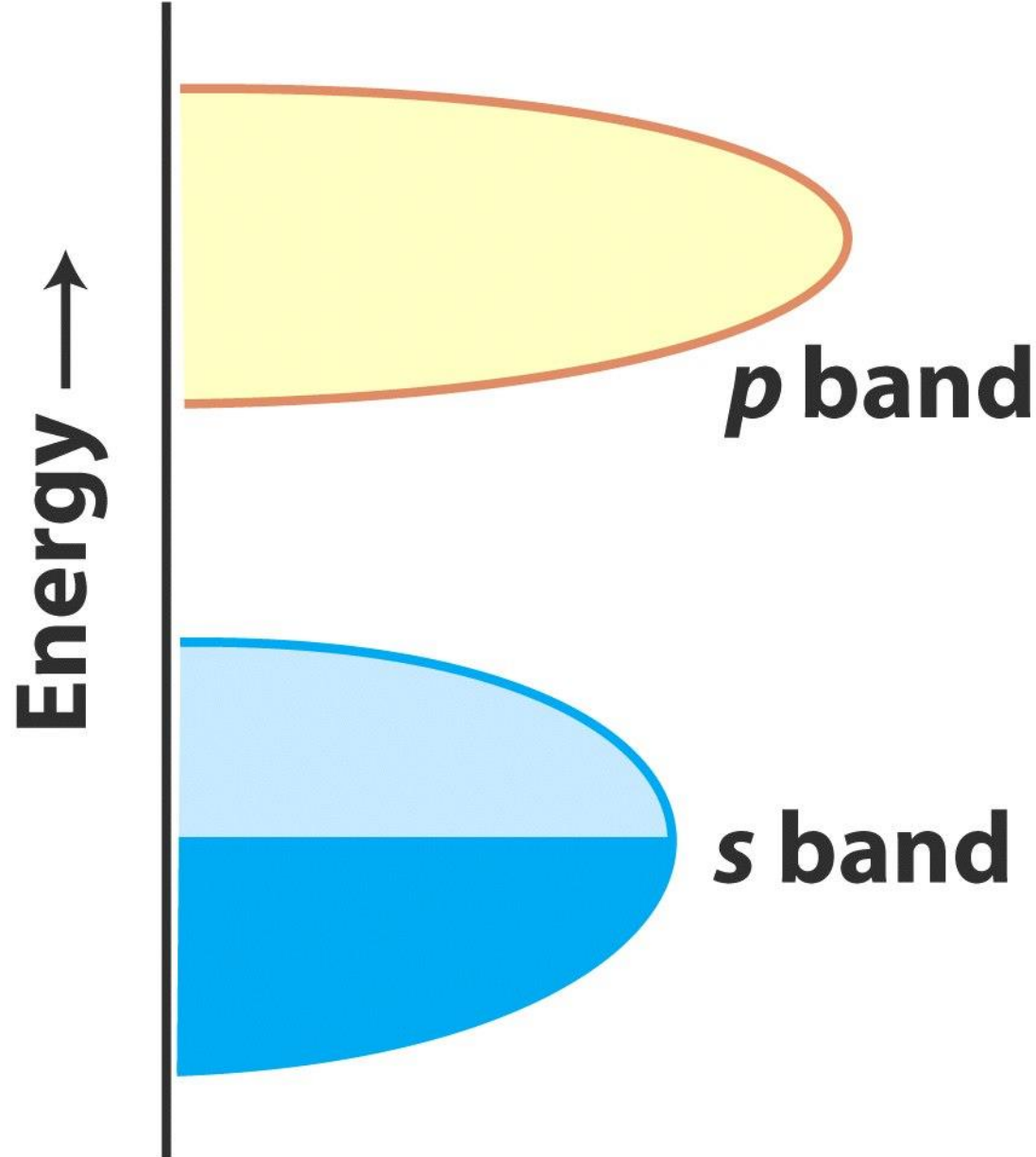




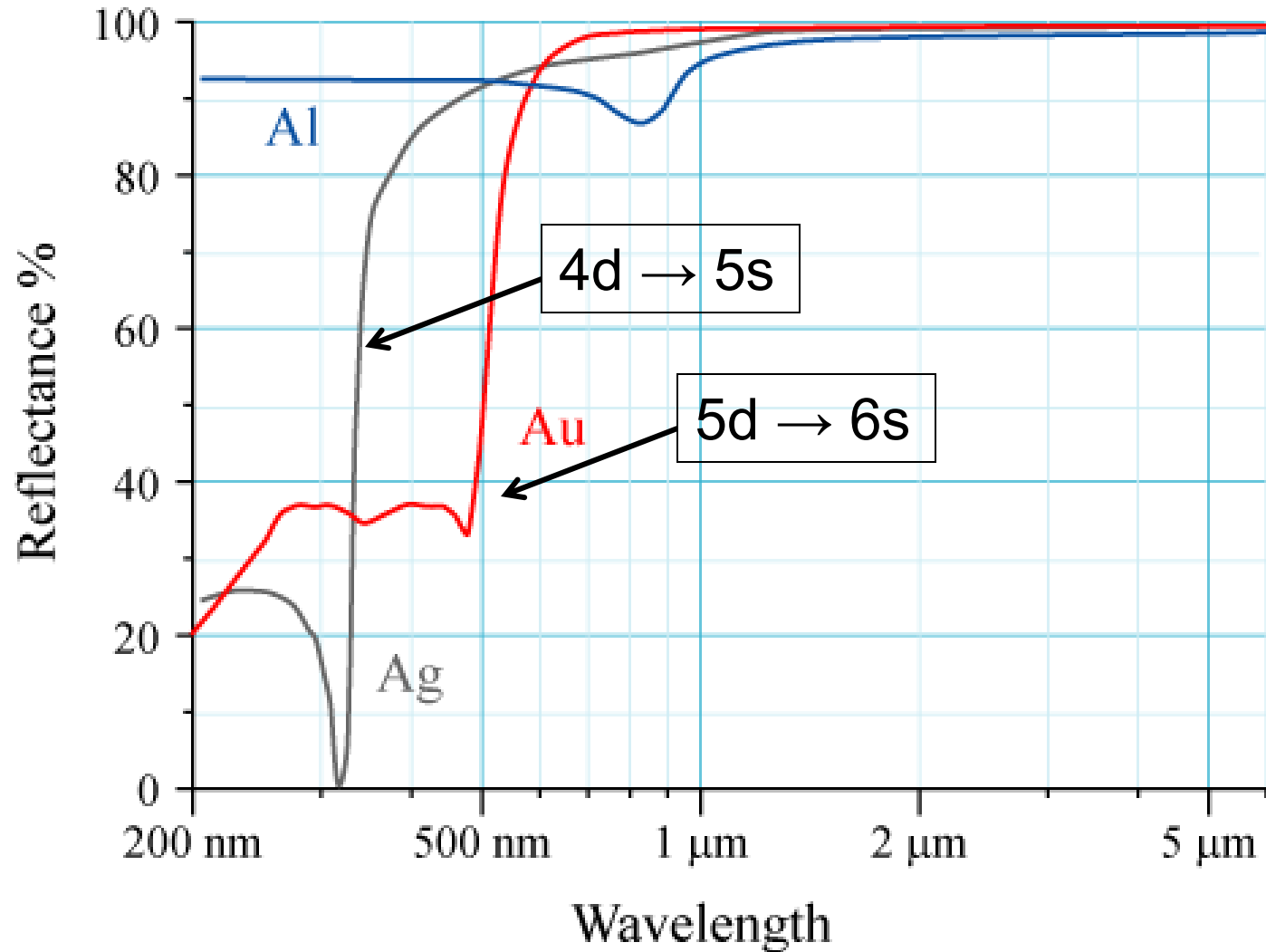
# Densità degli stati elettronici



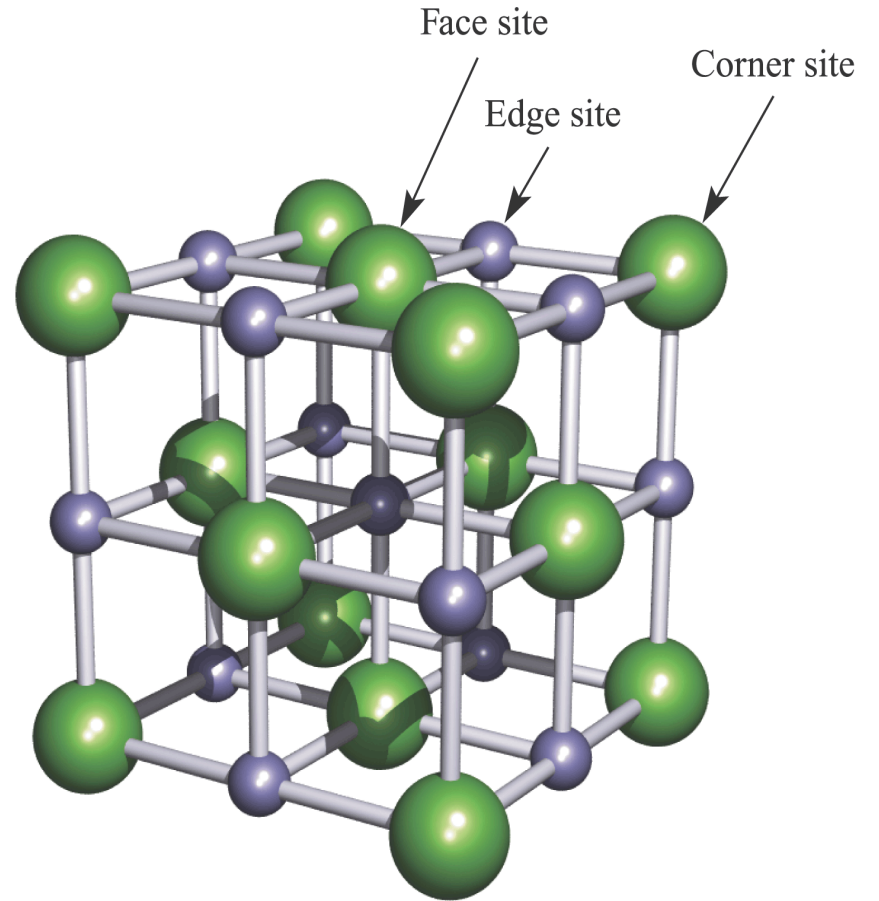
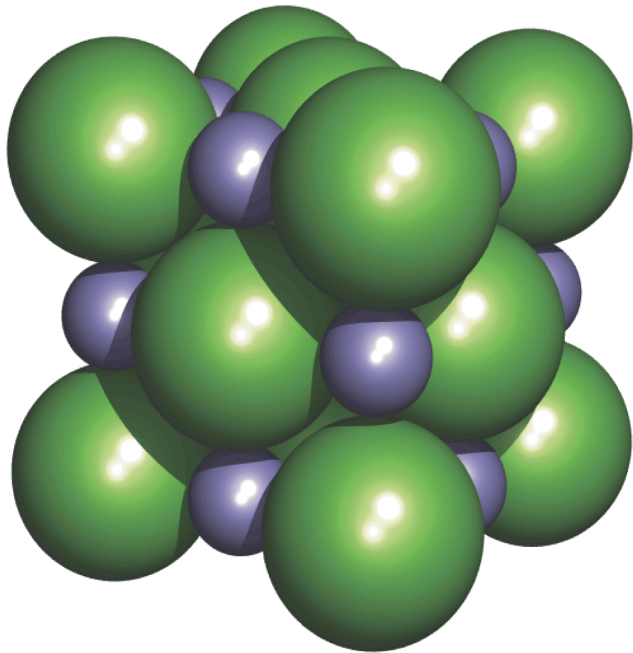
# Tipiche densità di stati in un metallo



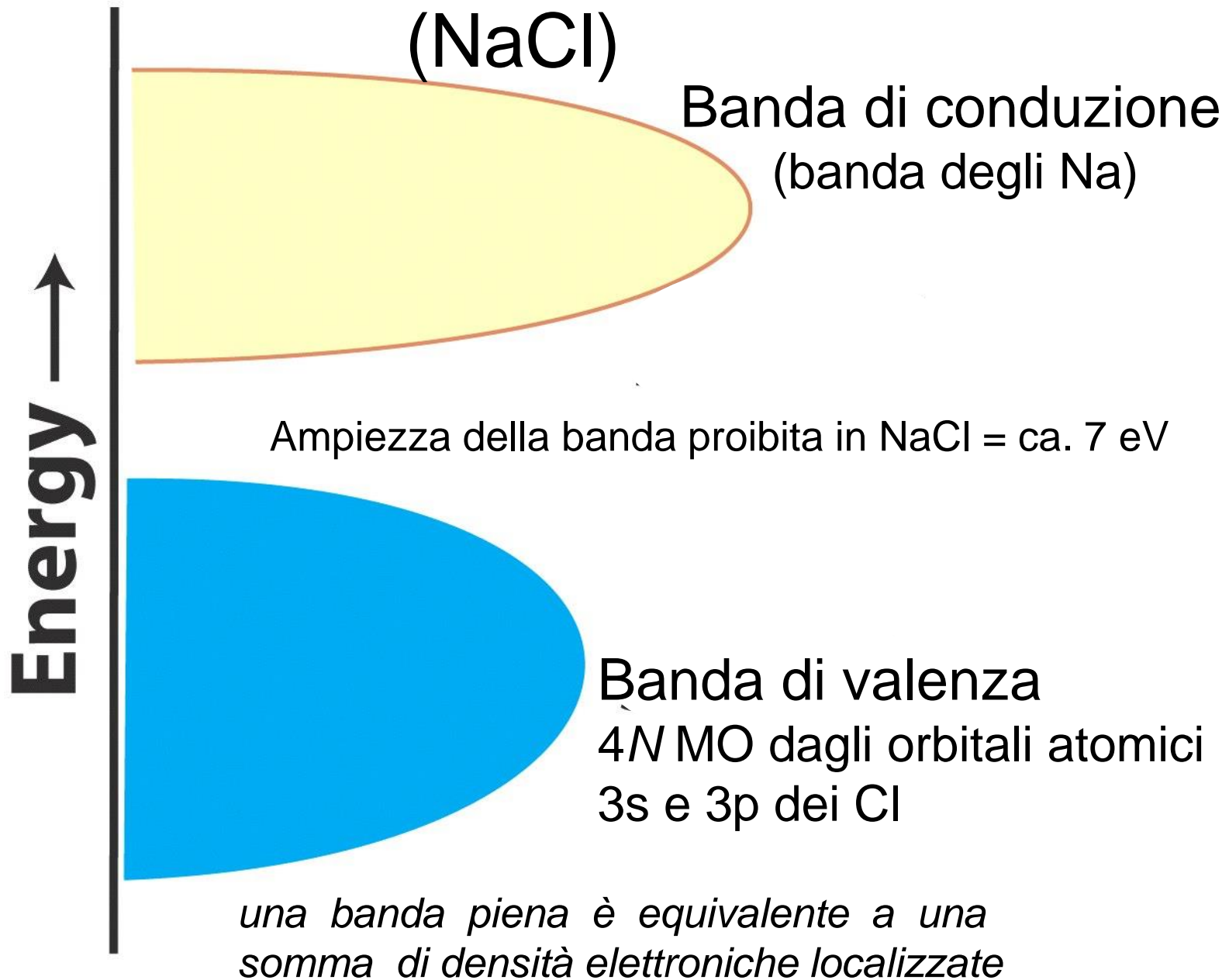
# Effetti relativistici e colore dell'oro



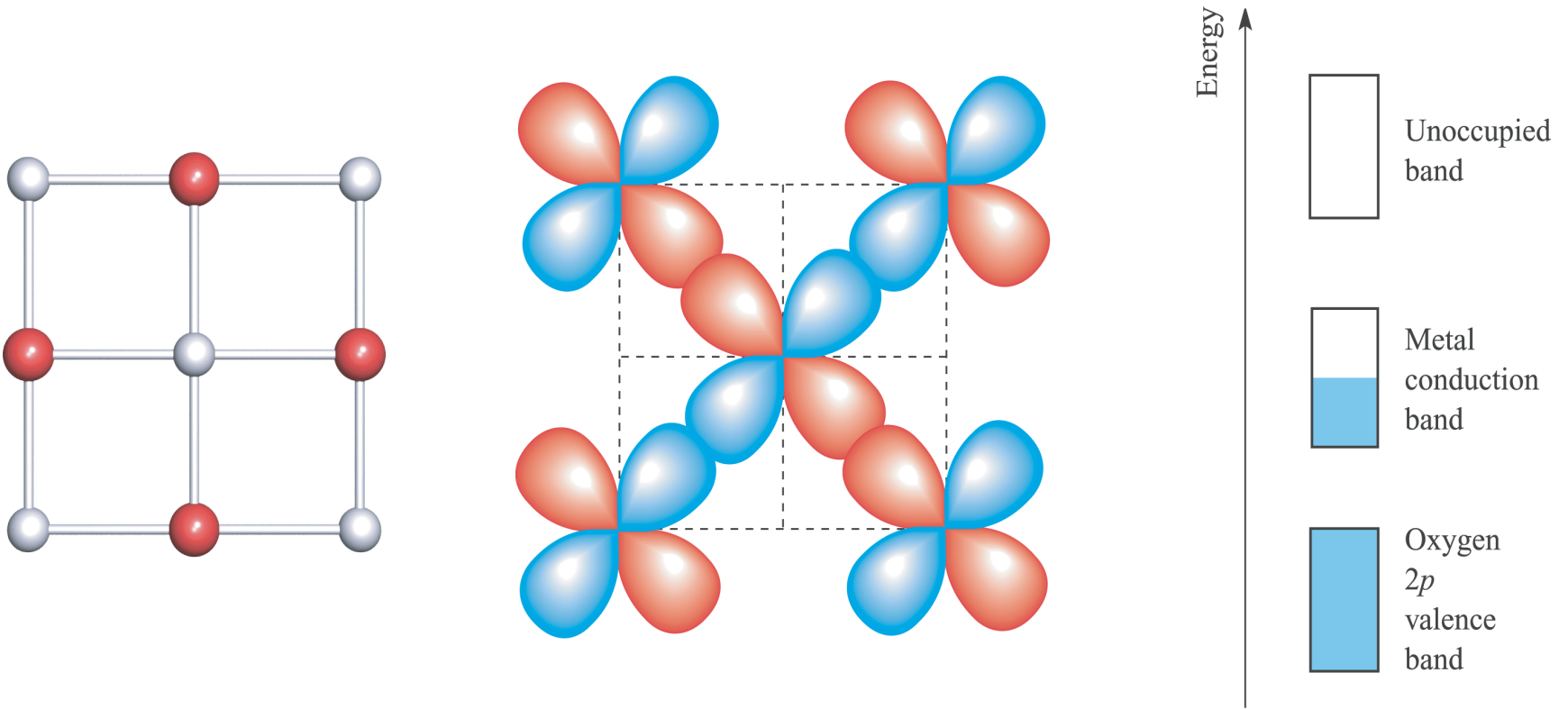
# NaCl



# Tipiche densità di stati in un isolante



# TiO, un ossido metallico conduttore

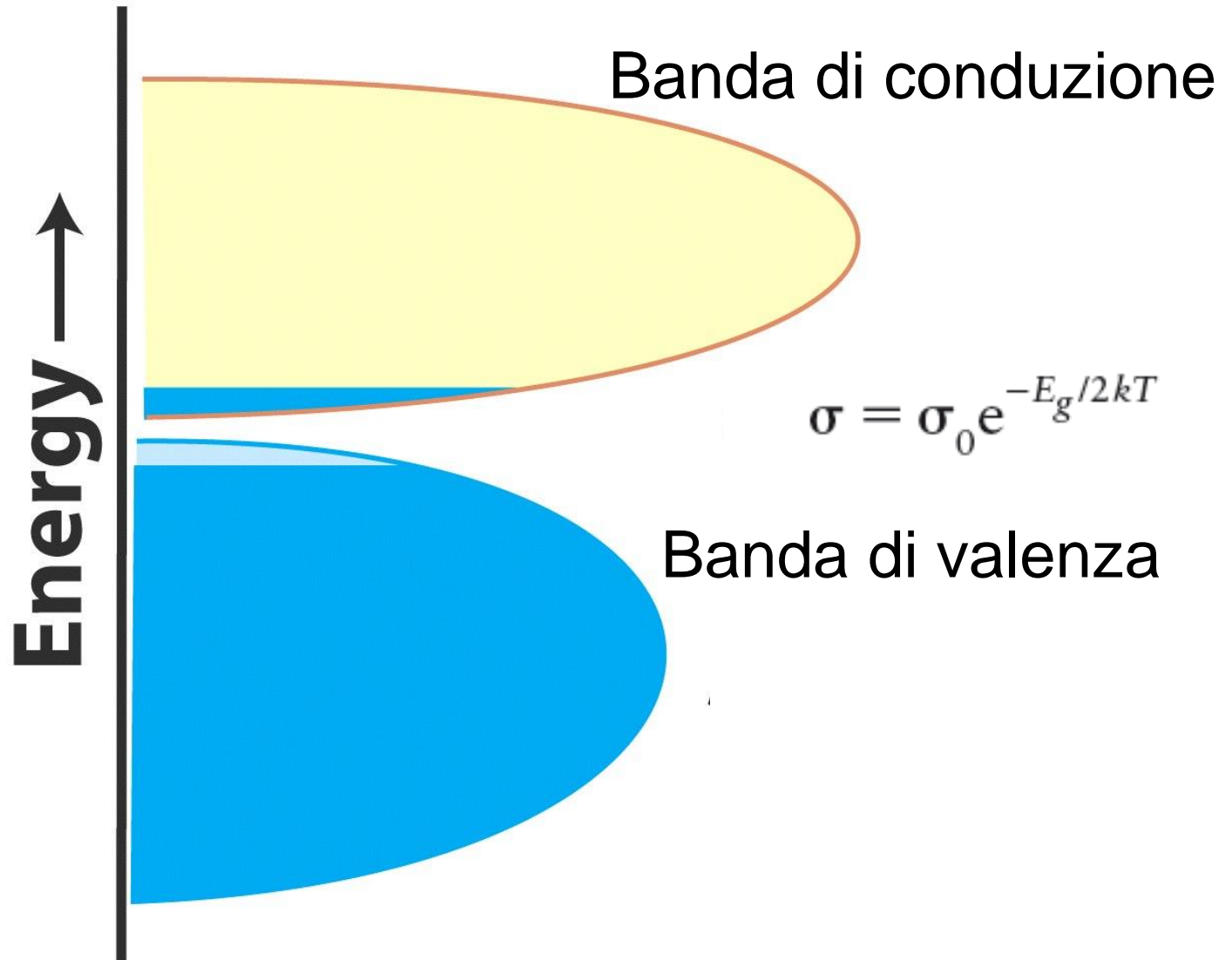


# Alcune ampiezze di bande proibite

| Material         | $E_g$ /eV |
|------------------|-----------|
| Carbon (diamond) | 5.47      |
| Silicon carbide  | 3.00      |
| Silicon          | 1.11      |
| Germanium        | 0.66      |
| Gallium arsenide | 1.35      |
| Indium arsenide  | 0.36      |

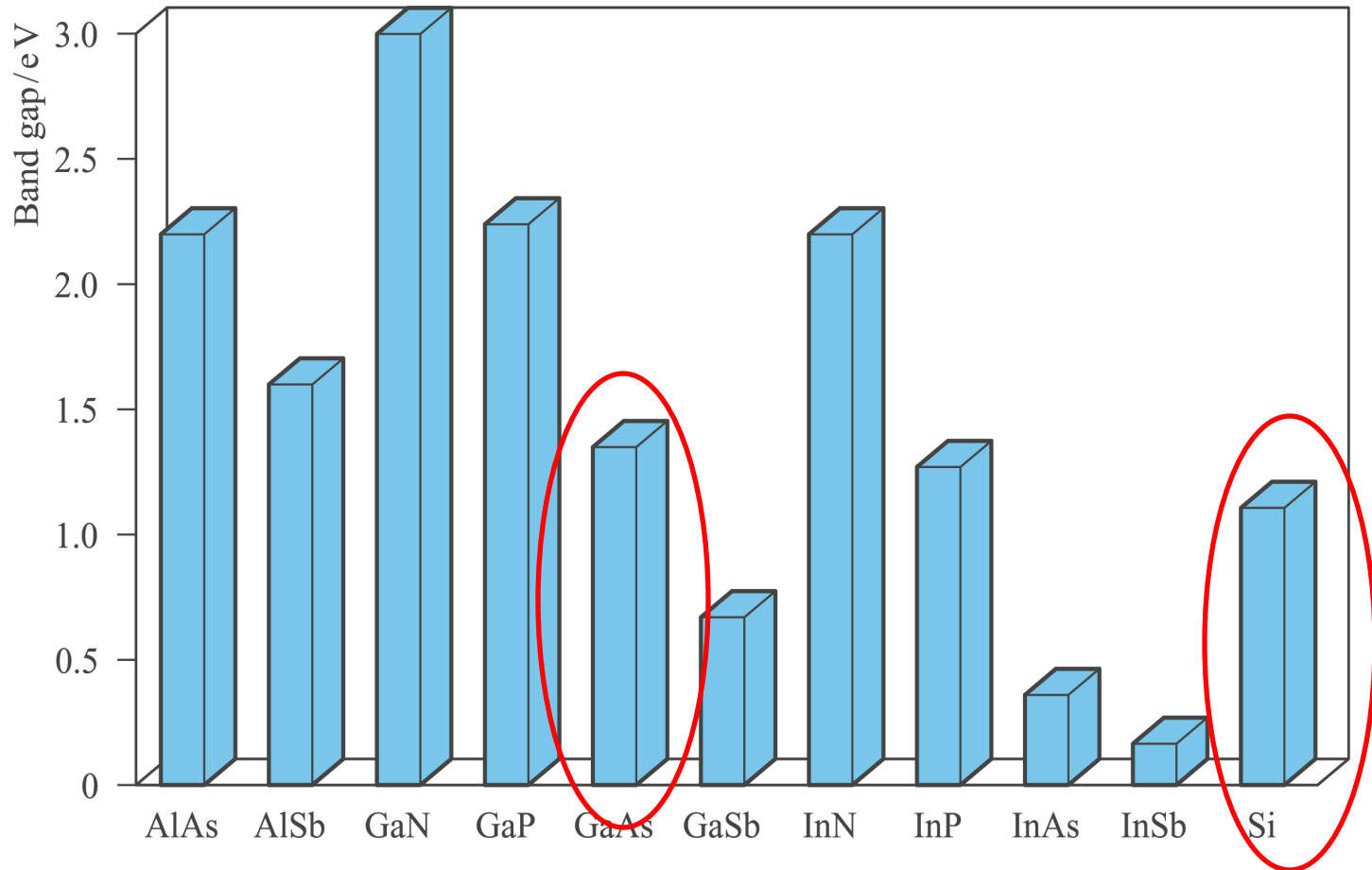
# Semiconduttore intrinseco

*andamento di tipo Arrhenius della conducibilità con la temperatura*

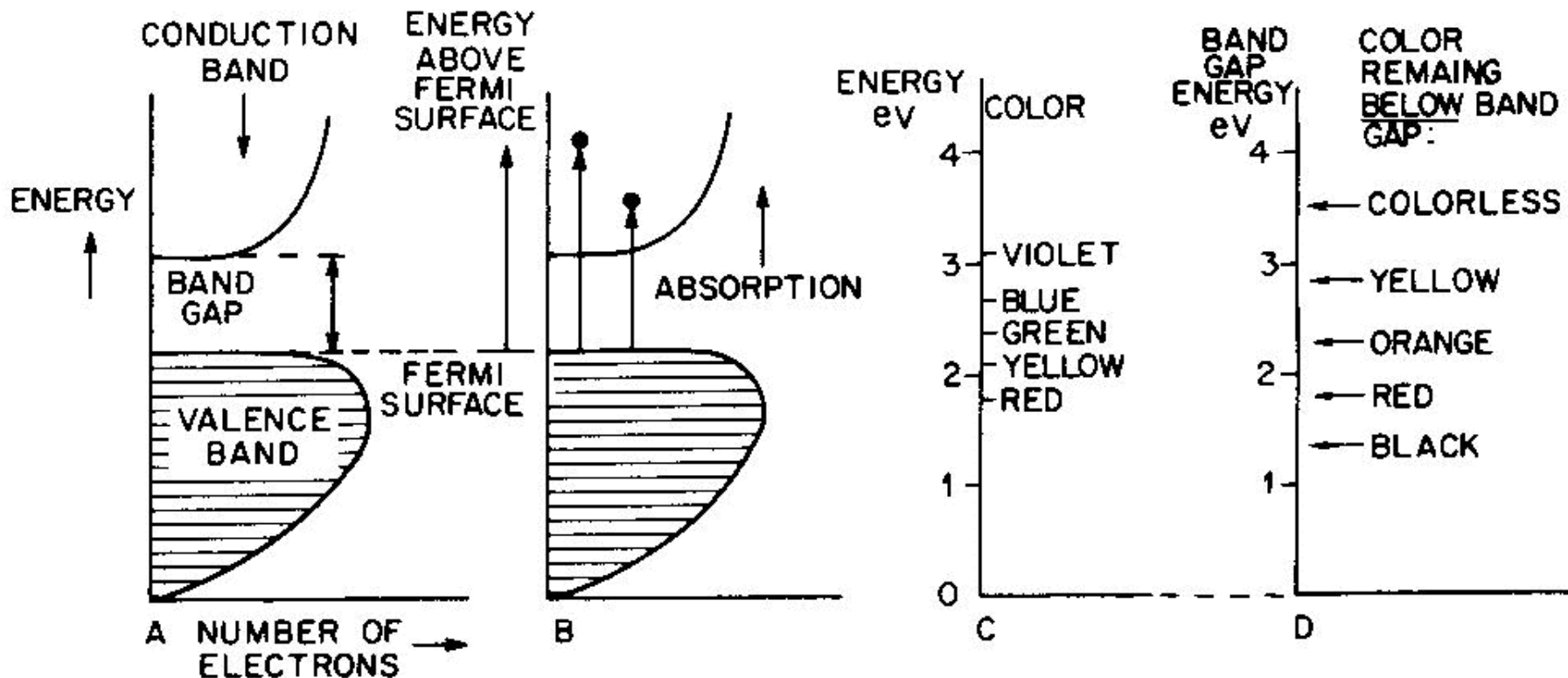




# Bande proibite in tipici semiconduttori III-V e Si



# Ampiezza della bande proibita e colore dei semiconduttori



*e.g. la galena,  $PbS$ , è grigio-nera poiché il band gap è solo 0.4 eV, cioè assorbe tutto il range della luce visibile.*

# Luce emessa dai LED in funzione della composizione

| $x$ in $\text{GaAs}_{1-x}\text{P}_x$ | Substrate | $\lambda$ / nm | Observed colour or region of spectrum |
|--------------------------------------|-----------|----------------|---------------------------------------|
| 0.10                                 | GaAs      | 780            | Infrared                              |
| 0.39                                 | GaAs      | 660            | Red                                   |
| 0.55                                 | GaP       | 650            | Red                                   |
| 0.65                                 | GaP       | 630            | Orange                                |
| 0.75                                 | GaP       | 610            | Orange                                |
| 0.85                                 | GaP       | 590            | Yellow                                |

# Semiconduttori estrinseci

(drogaggio sostitutivo)

e.g. Si drogato con As

e.g. Si drogato con Ga

