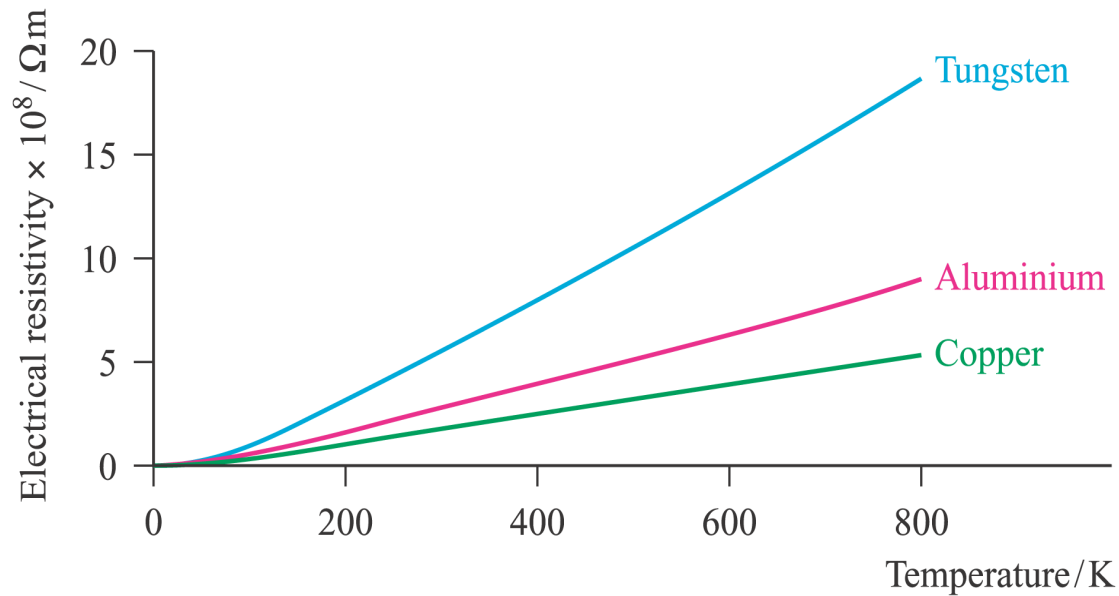
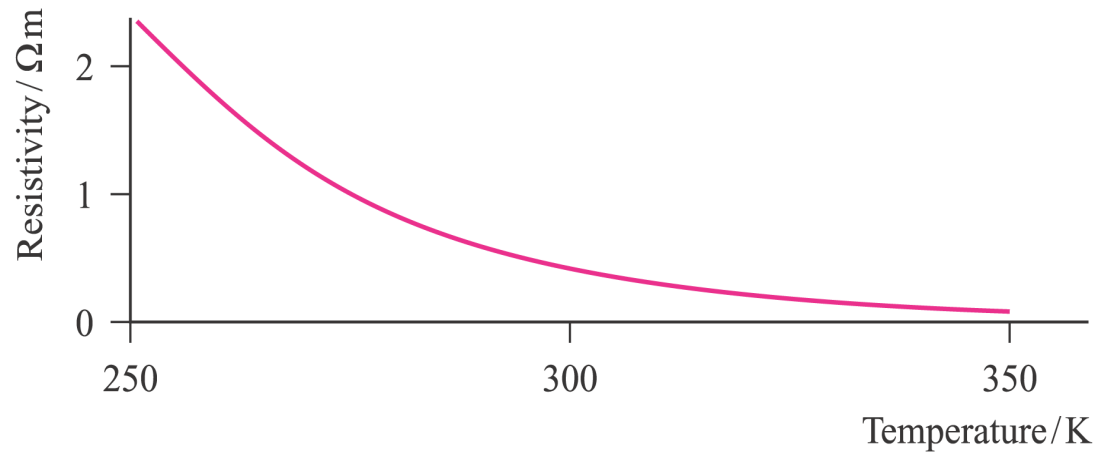
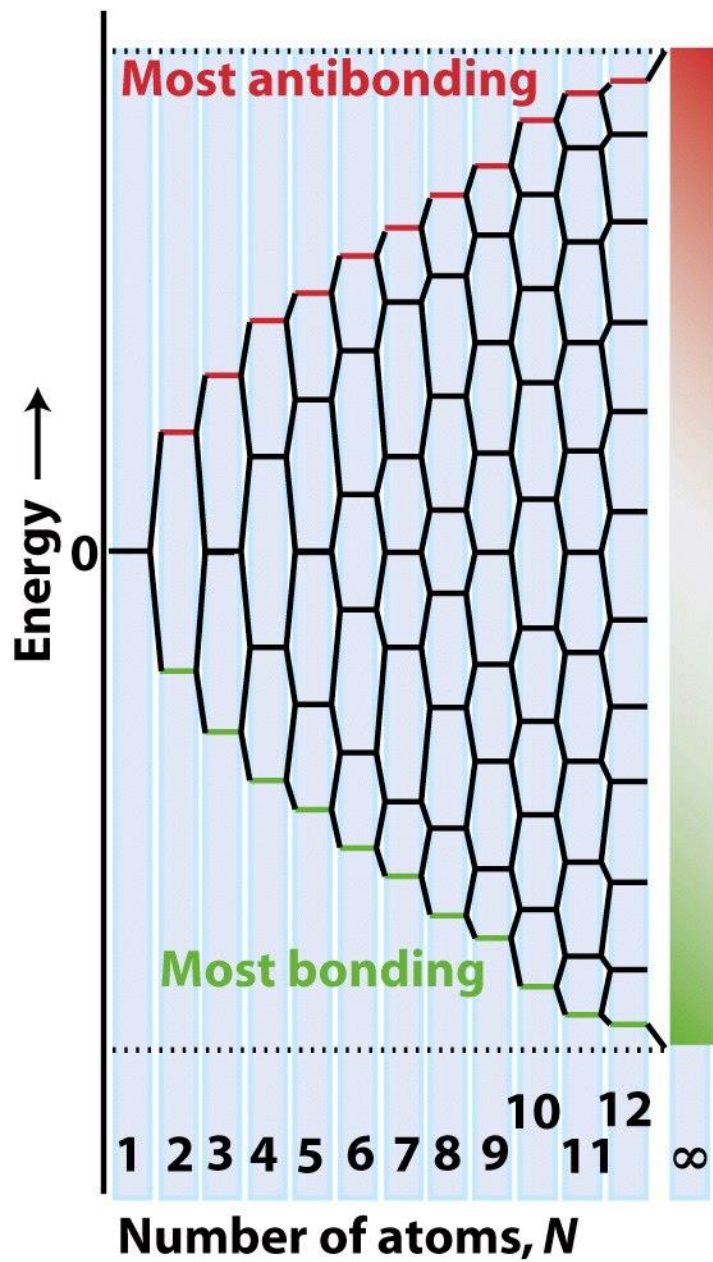


# Resistività di alcuni metalli in funzione della temperatura



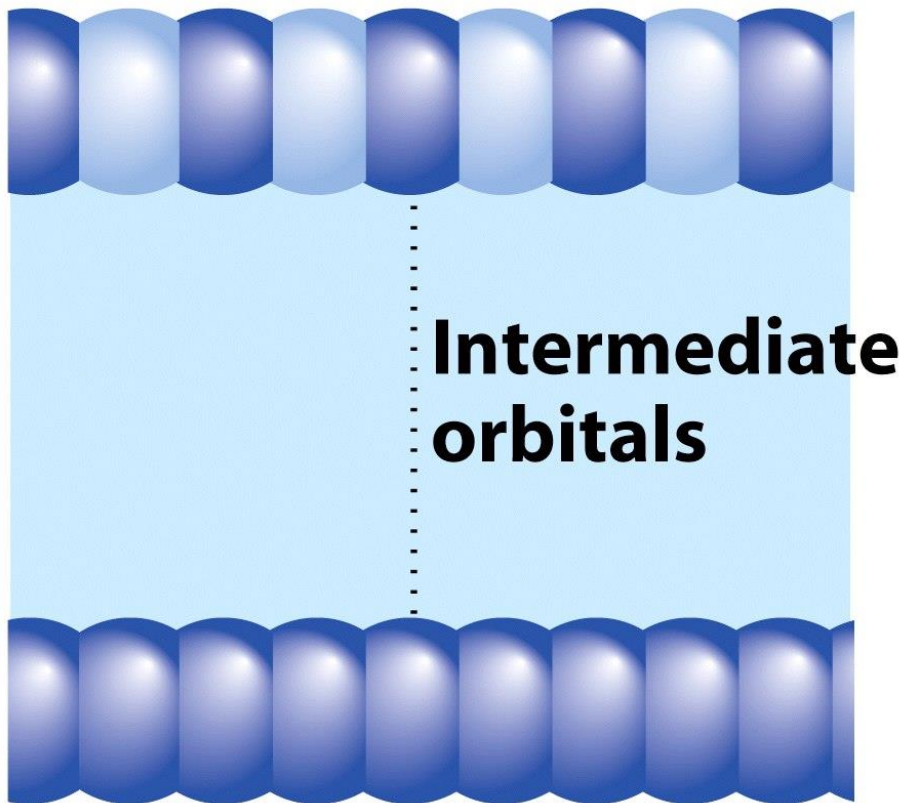
# Resistività del semiconduttore Ge in funzione della temperatura





## Banda s

**Most antibonding**

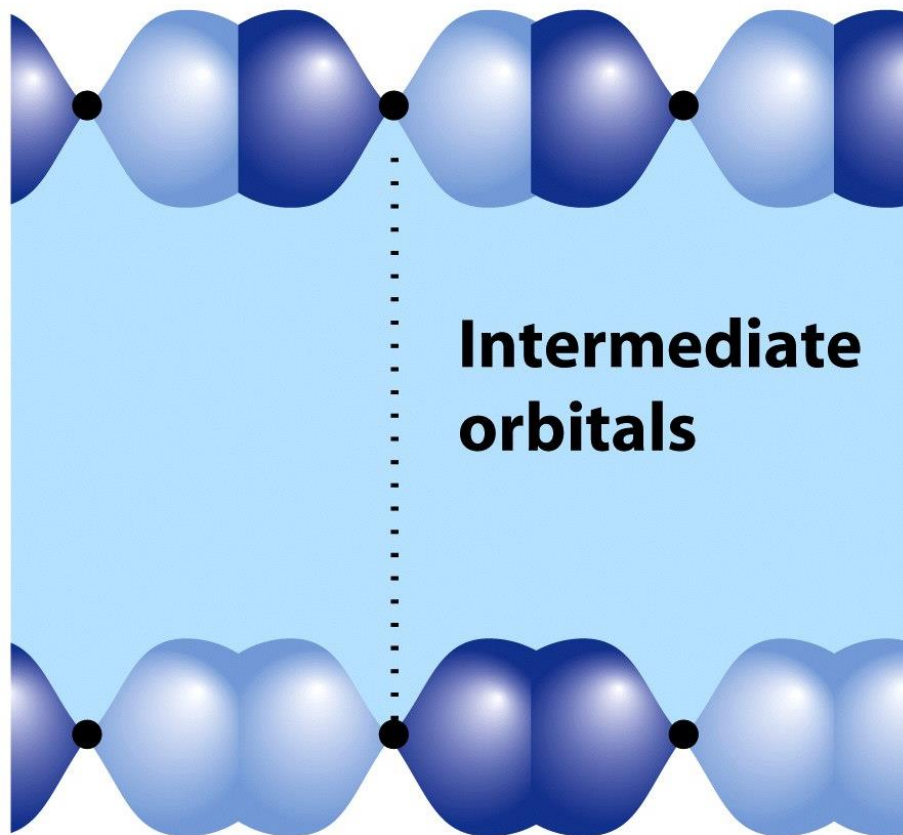


**Intermediate orbitals**

**Most bonding**

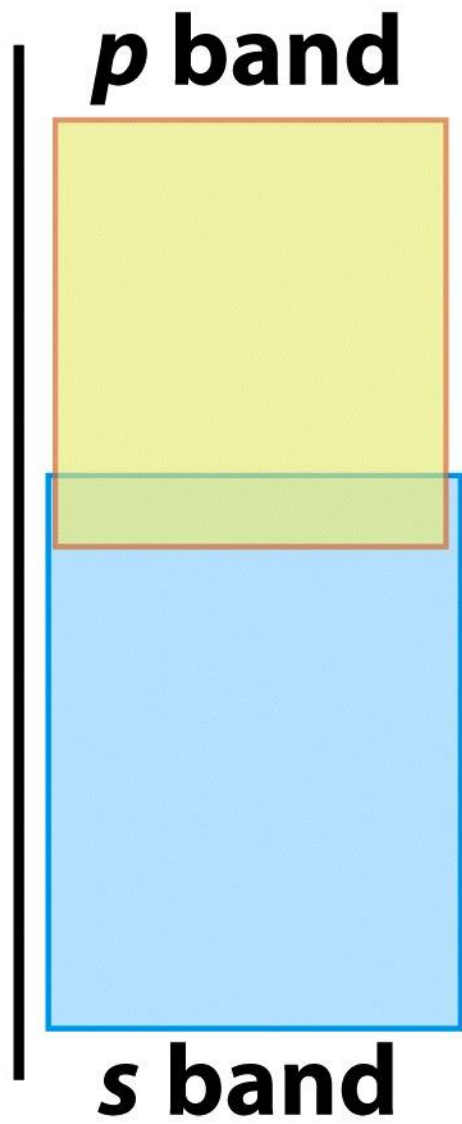
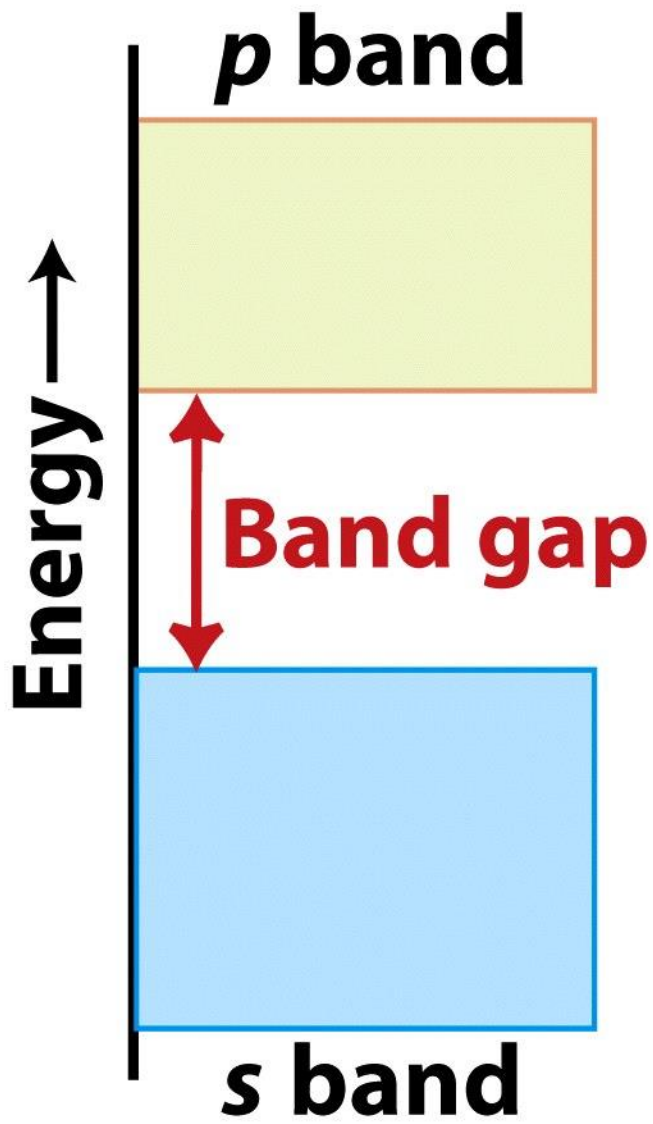
## Banda p

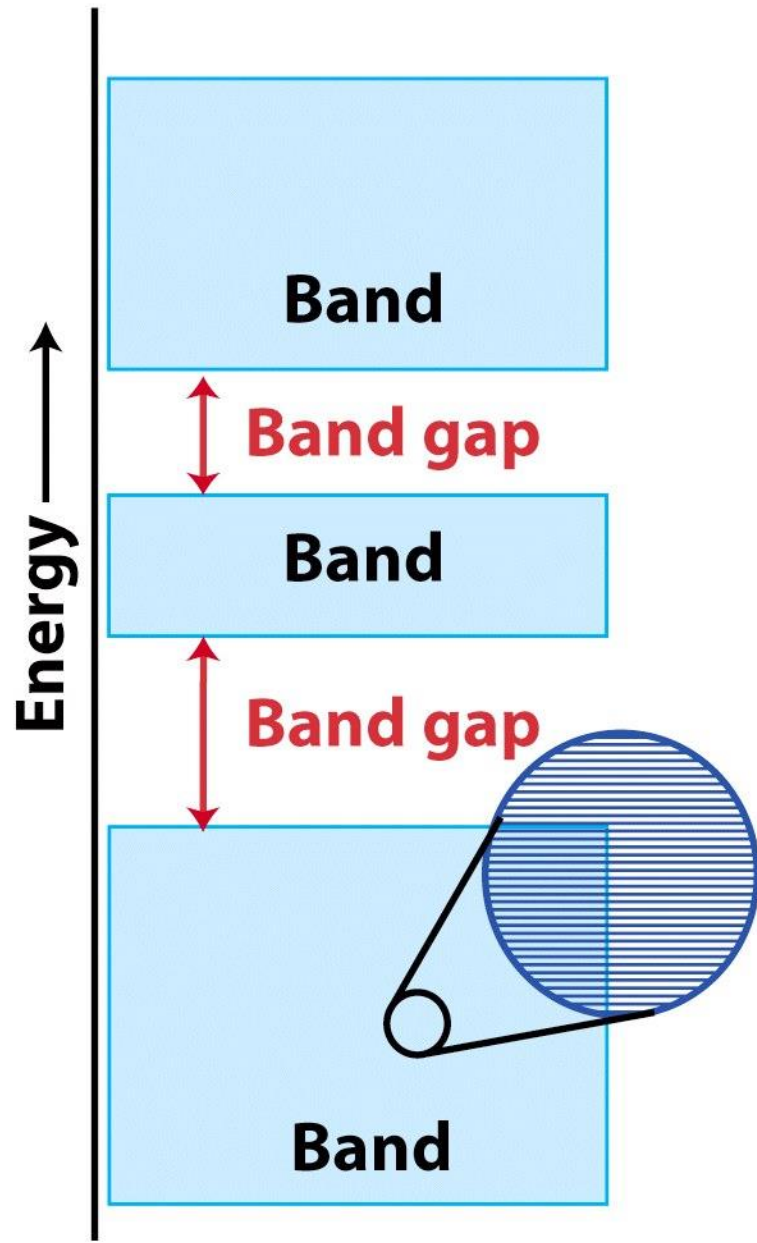
**Most antibonding**



**Intermediate orbitals**

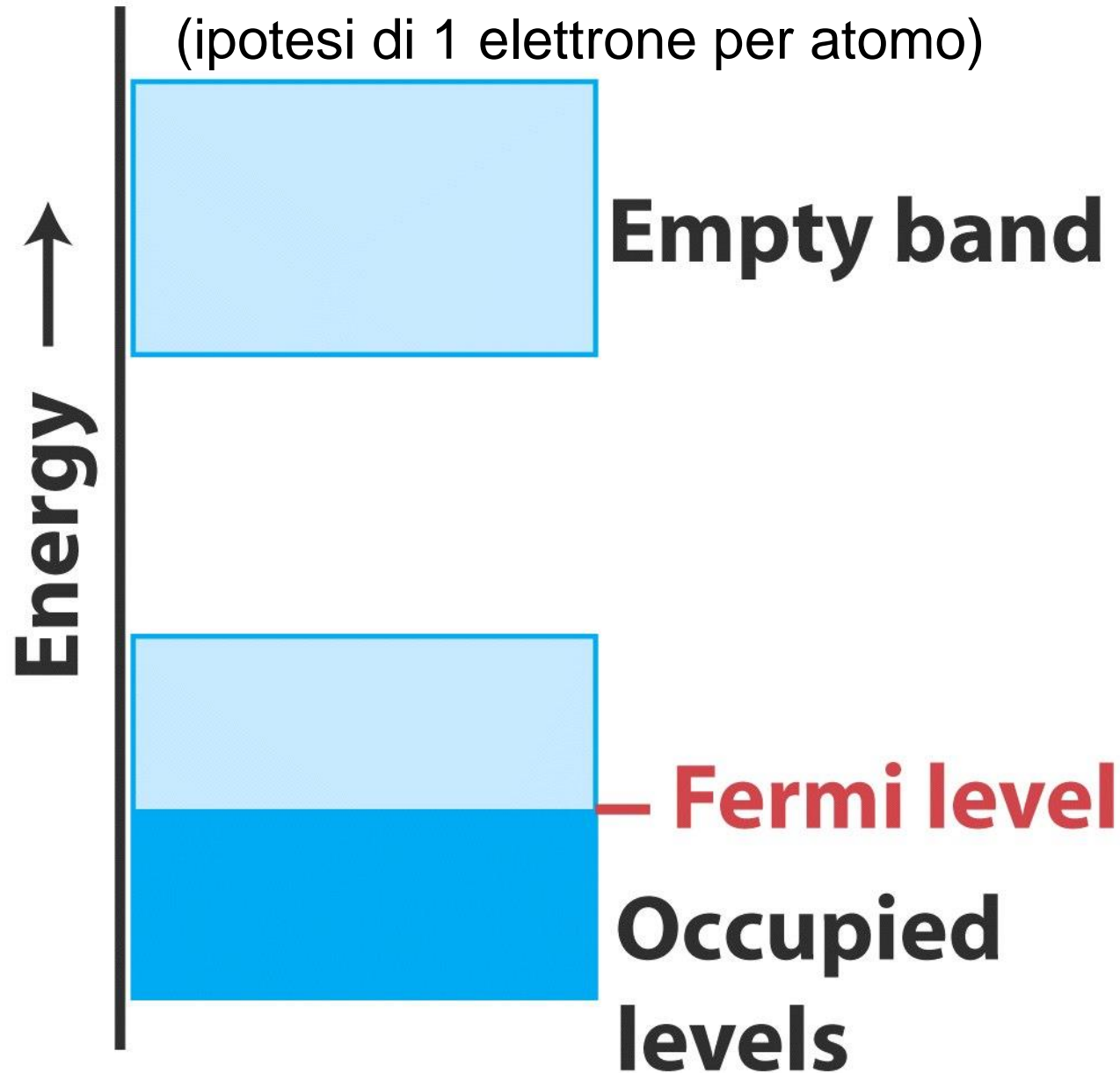
**Most bonding**





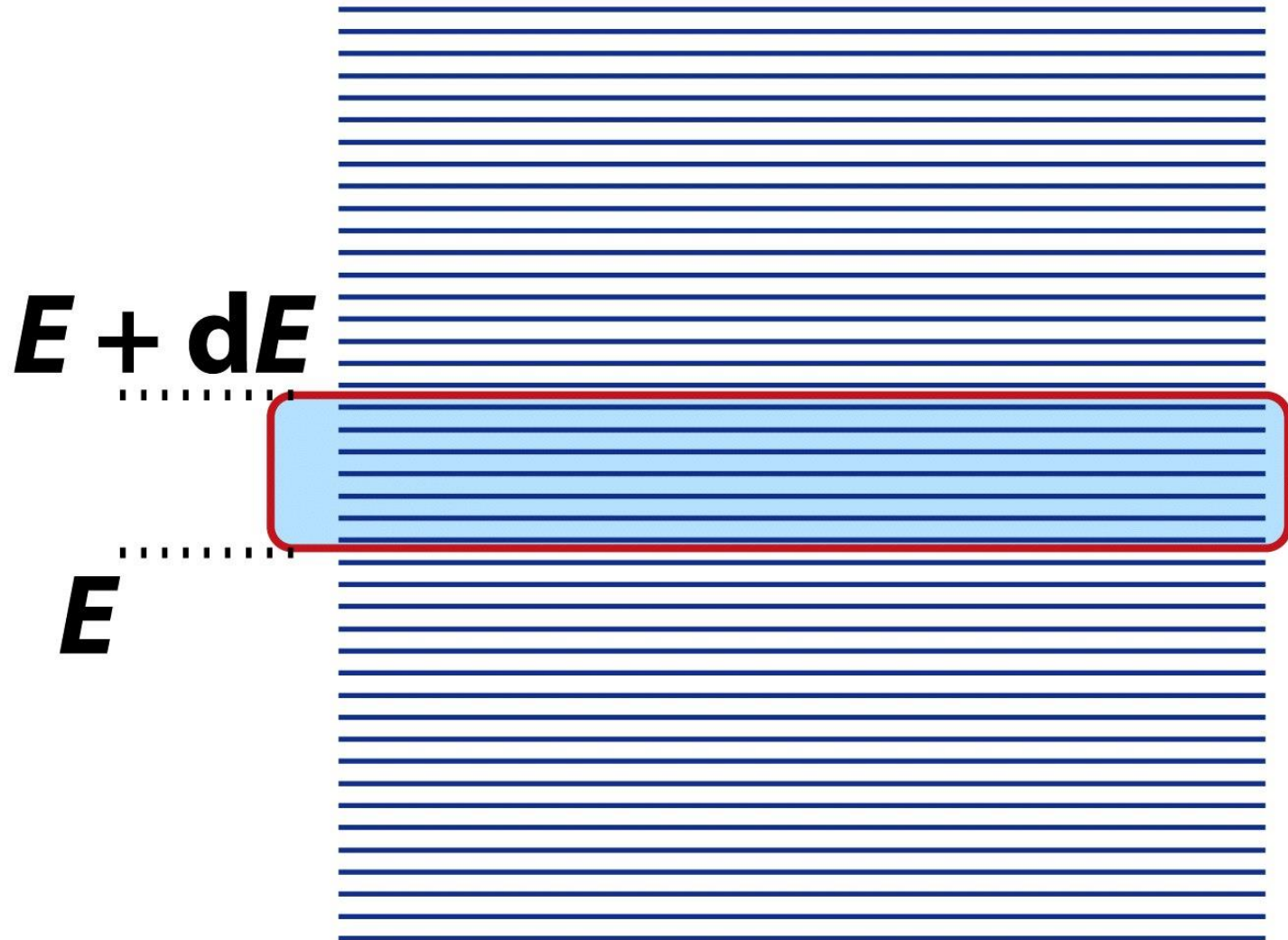
# Solido conduttore metallico

(ipotesi di 1 elettrone per atomo)

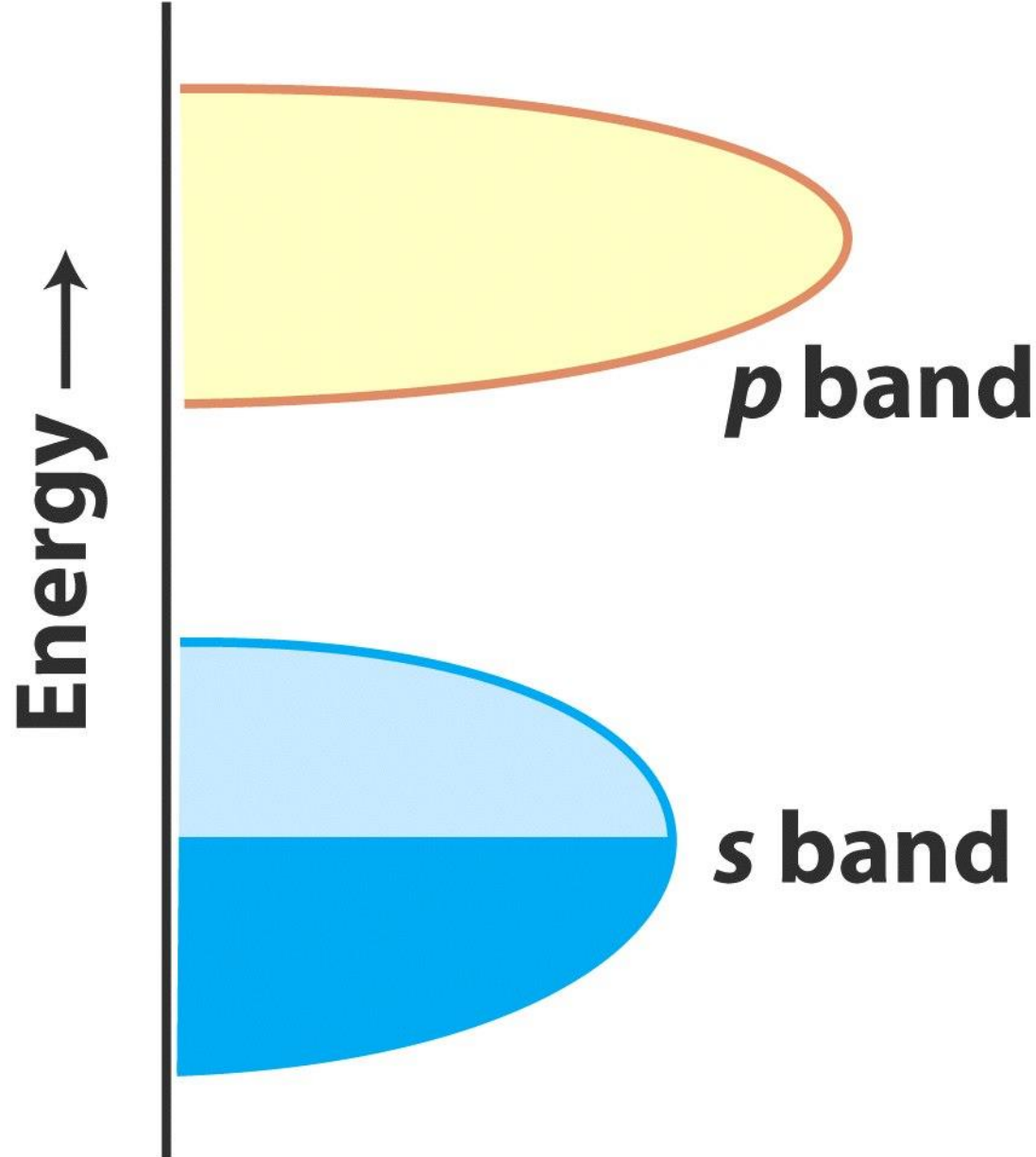




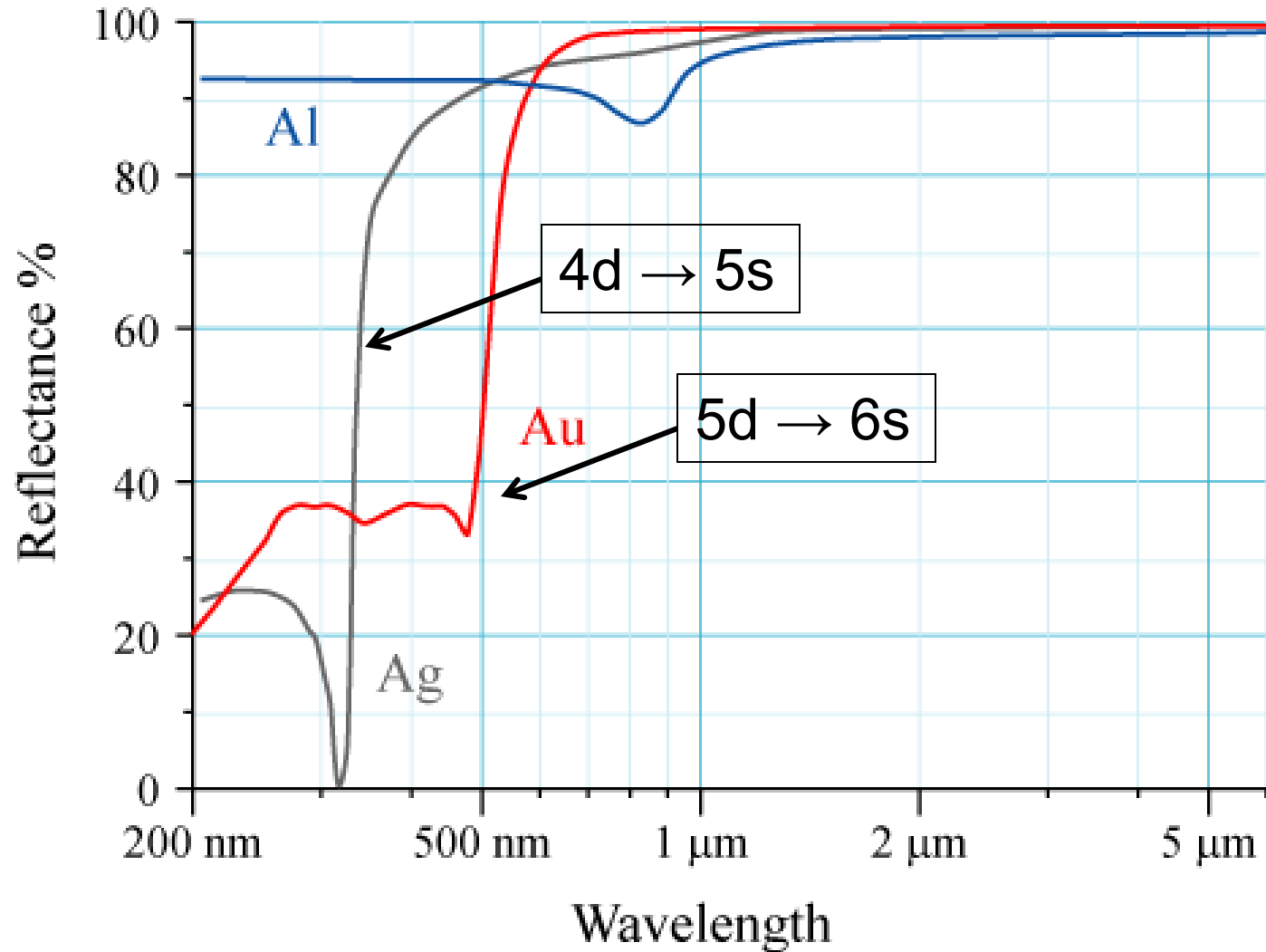
# Densità degli stati elettronici



# Tipiche densità di stati in un metallo



# Effetti relativistici e colore dell'oro

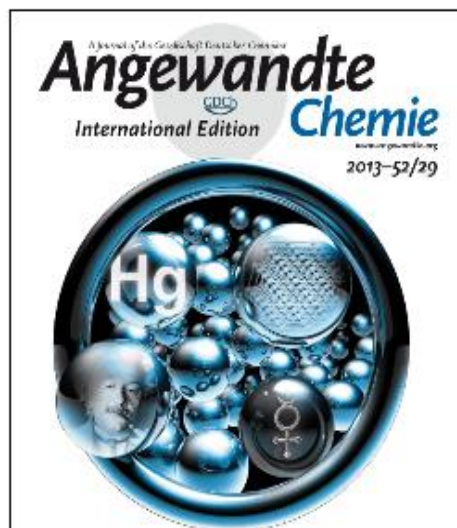


# Why Hg is liquid

Cover Picture: Evidence for Low-Temperature Melting of Mercury owing to Relativity (Angew. Chem. Int. Ed. 29/2013)

Dr. Florent Calvo, Dr. Elke Pahl, Dr. Michael Wormit, Prof. Dr. Peter Schwerdtfeger

Pages: 7323 | First Published: 21 June 2013

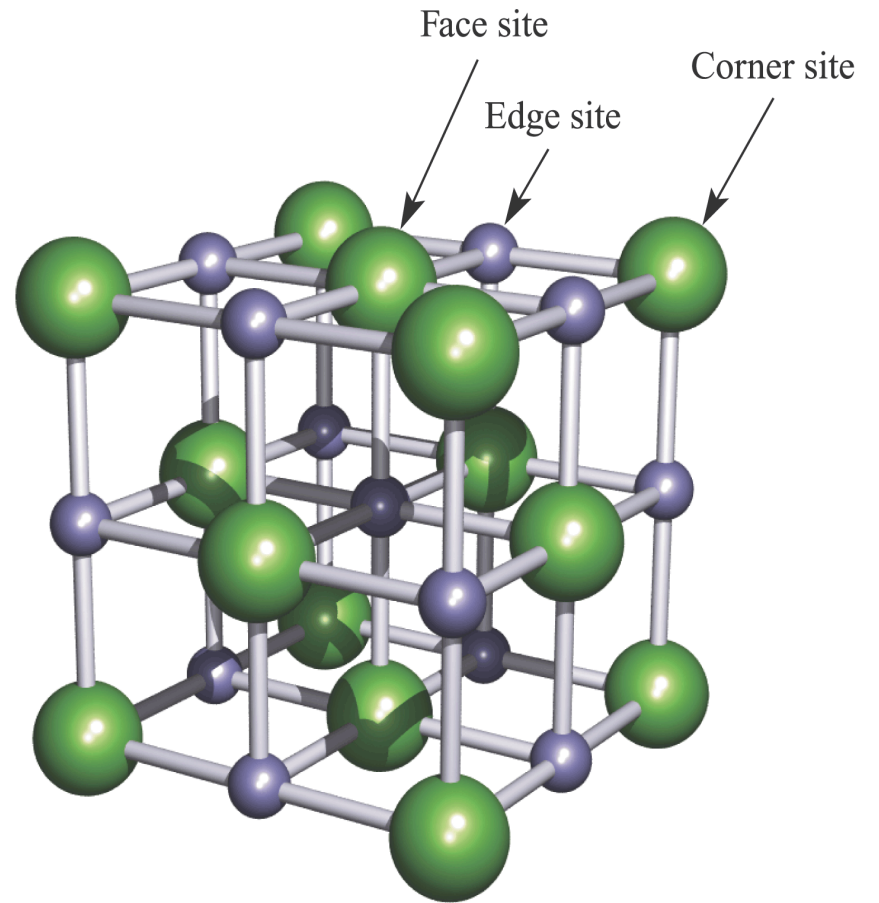
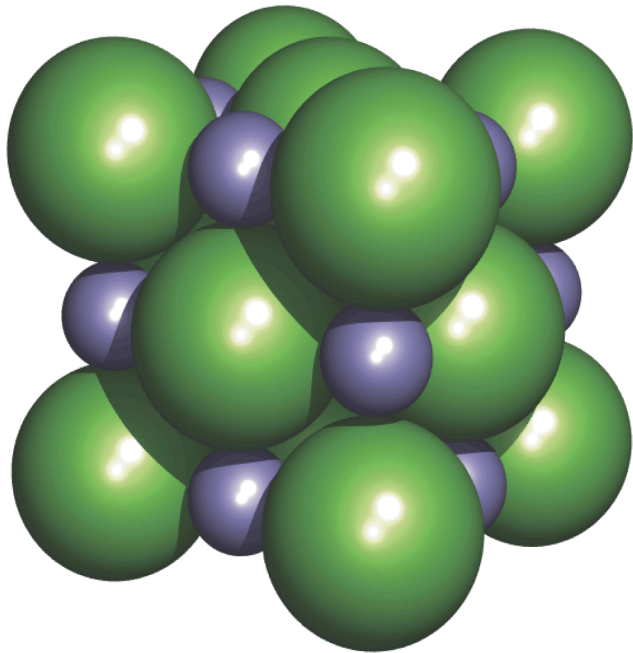


*The generalized theory of relativity* gives a correct explanation of the residual motion of the perihelion of planet mercury. As F. Calvo, P. Schwerdtfeger, et al. show in their Communication on page 7583 ff., the special theory of relativity has furnished an even more remarkable result. It gives the correct explanation as to why mercury is the only liquid metal at room temperature, as demonstrated by parallel-tempering Monte Carlo simulations (Picture: Cameron Smorenburg).

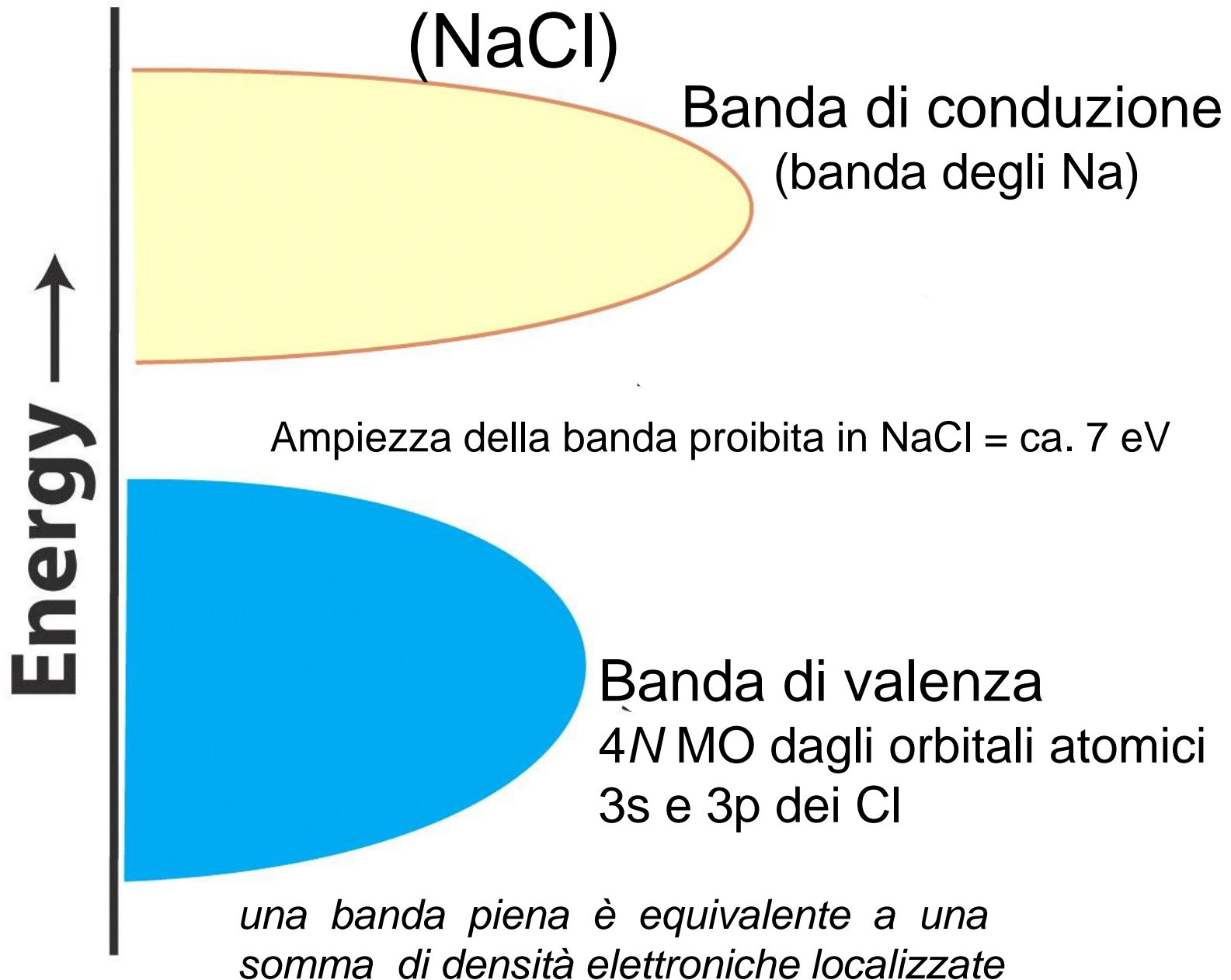
<https://www.youtube.com/watch?v=NtnsHtYYKf0>

L. J. Norrby Why is mercury liquid *J. Chem. Ed.* **1991**, *68*, 110.

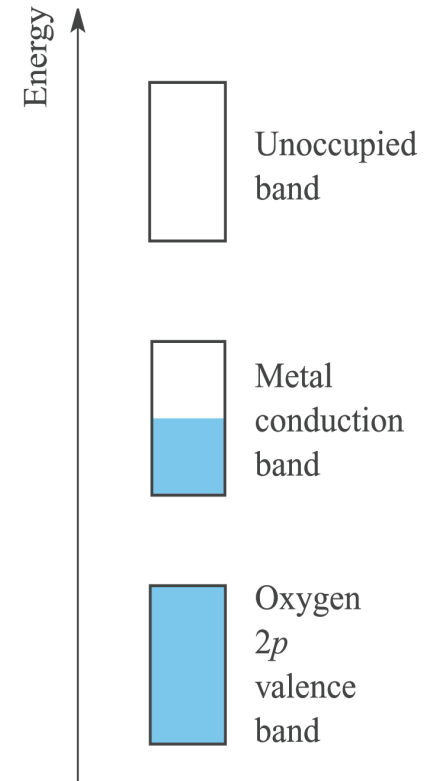
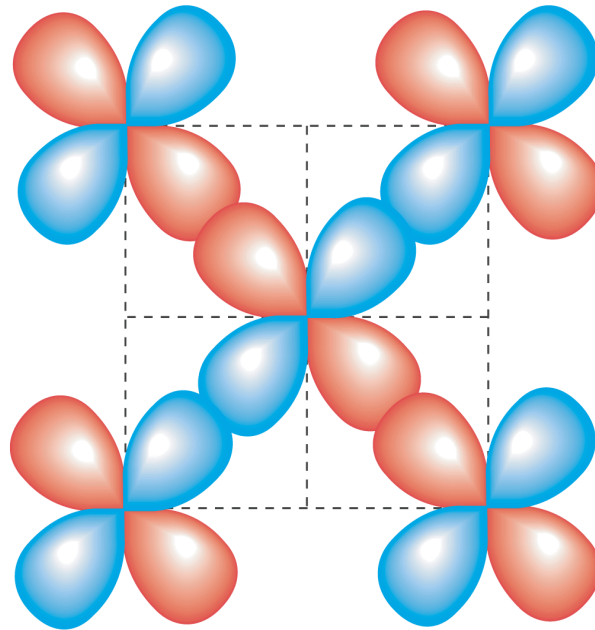
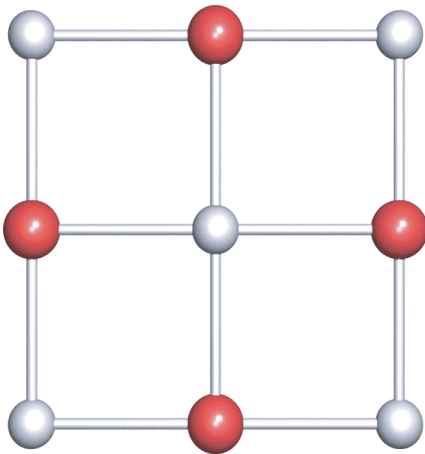
# NaCl



# Tipiche densità di stati in un isolante



# TiO, un ossido metallico conduttore



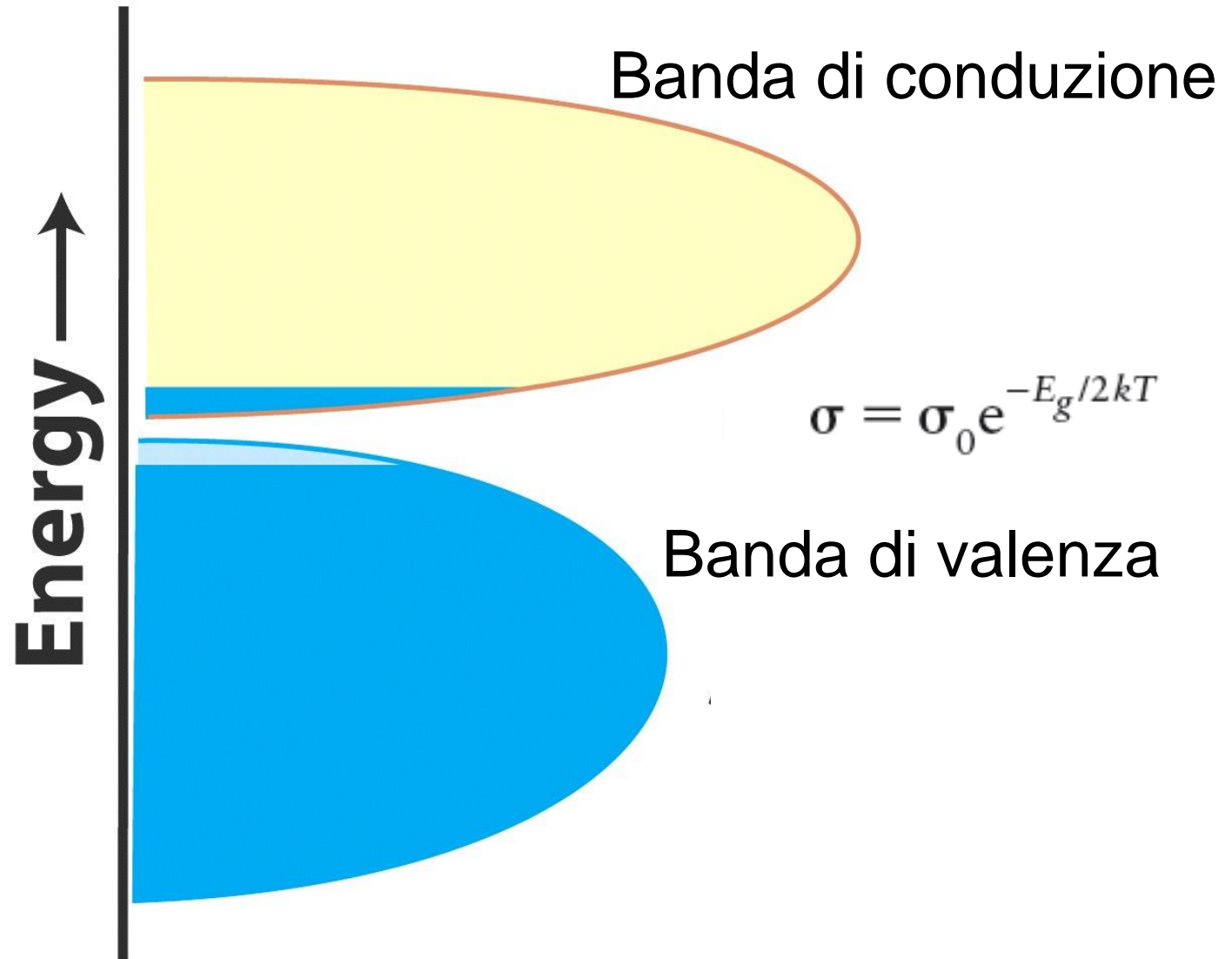
# Alcune ampiezze di bande proibite

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

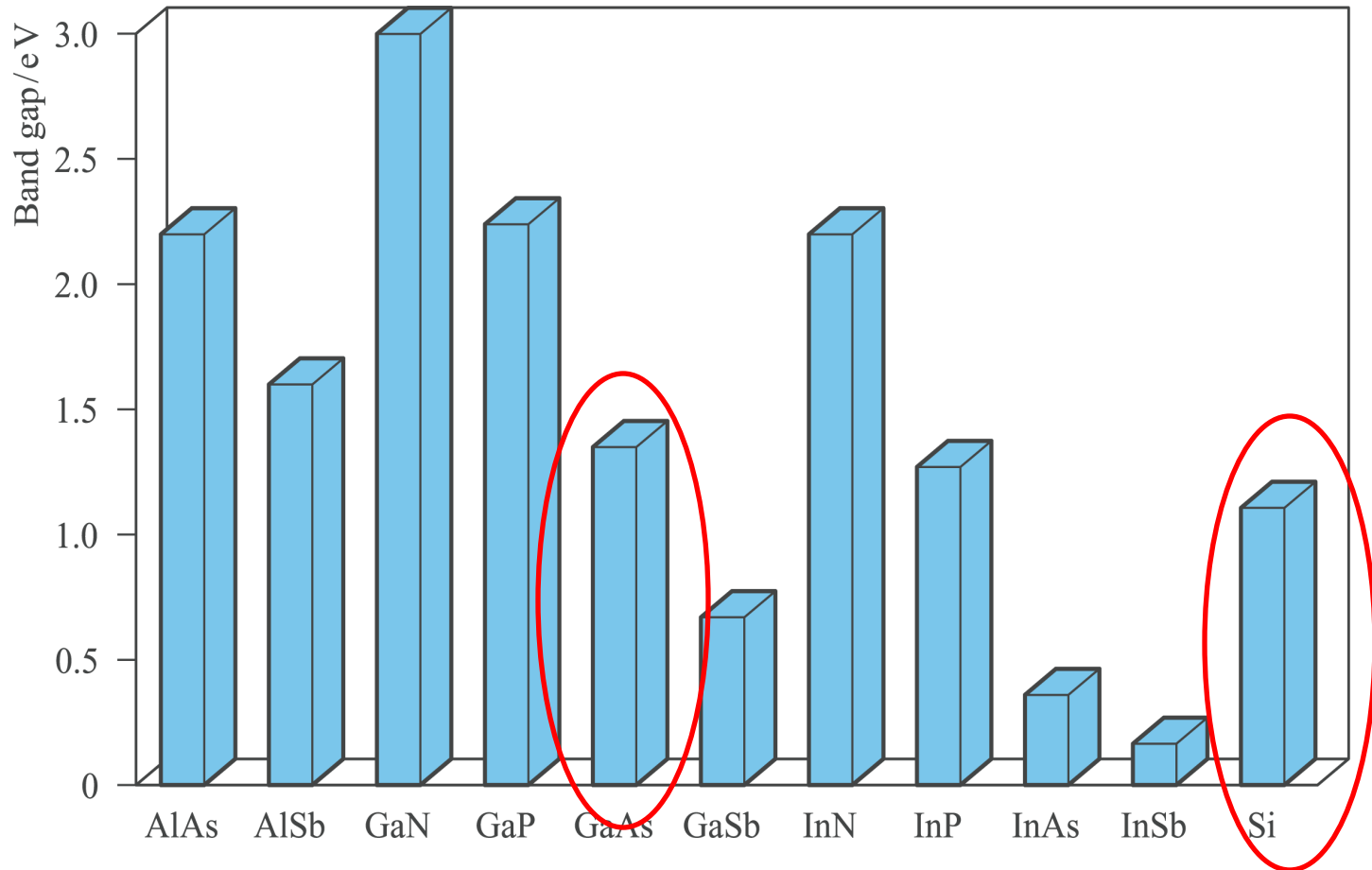


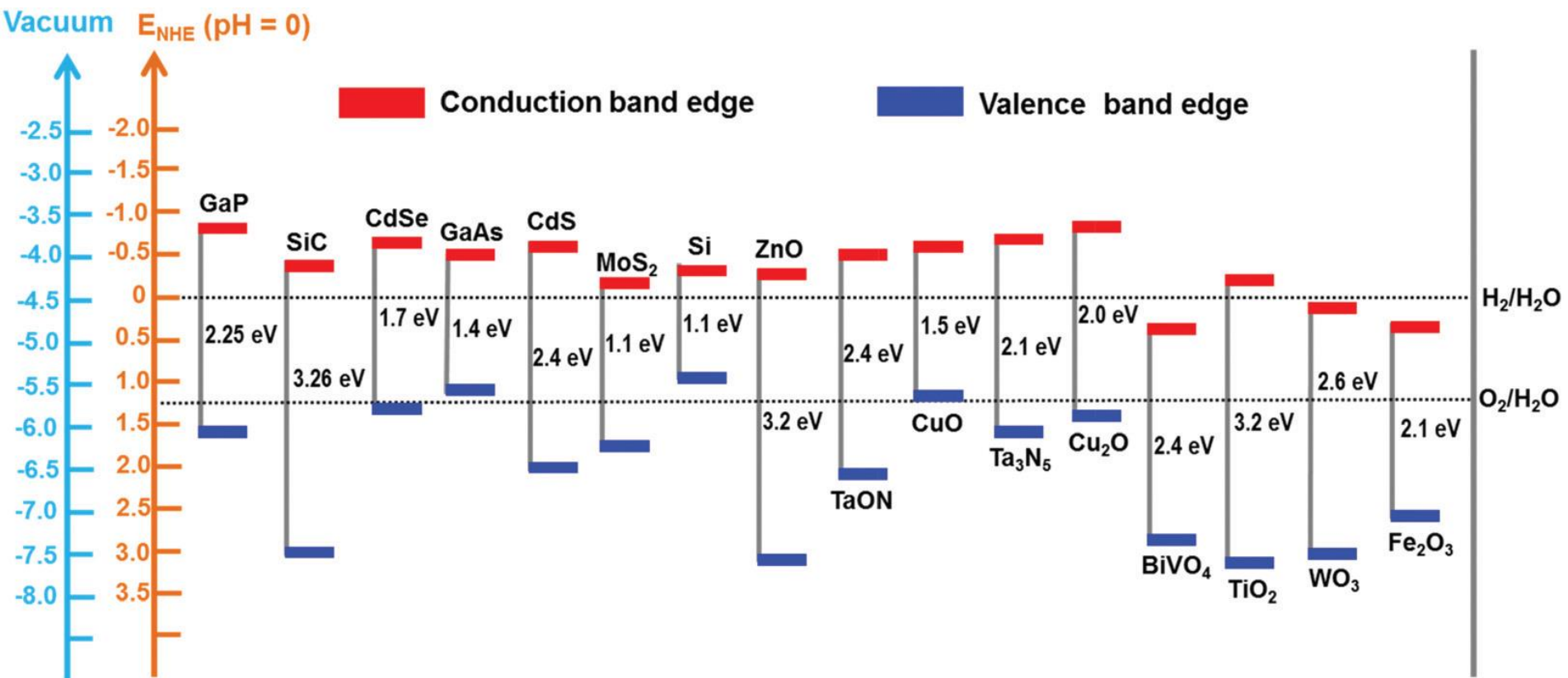
# Semiconduttore intrinseco

*andamento di tipo Arrhenius della conducibilità con la temperatura*

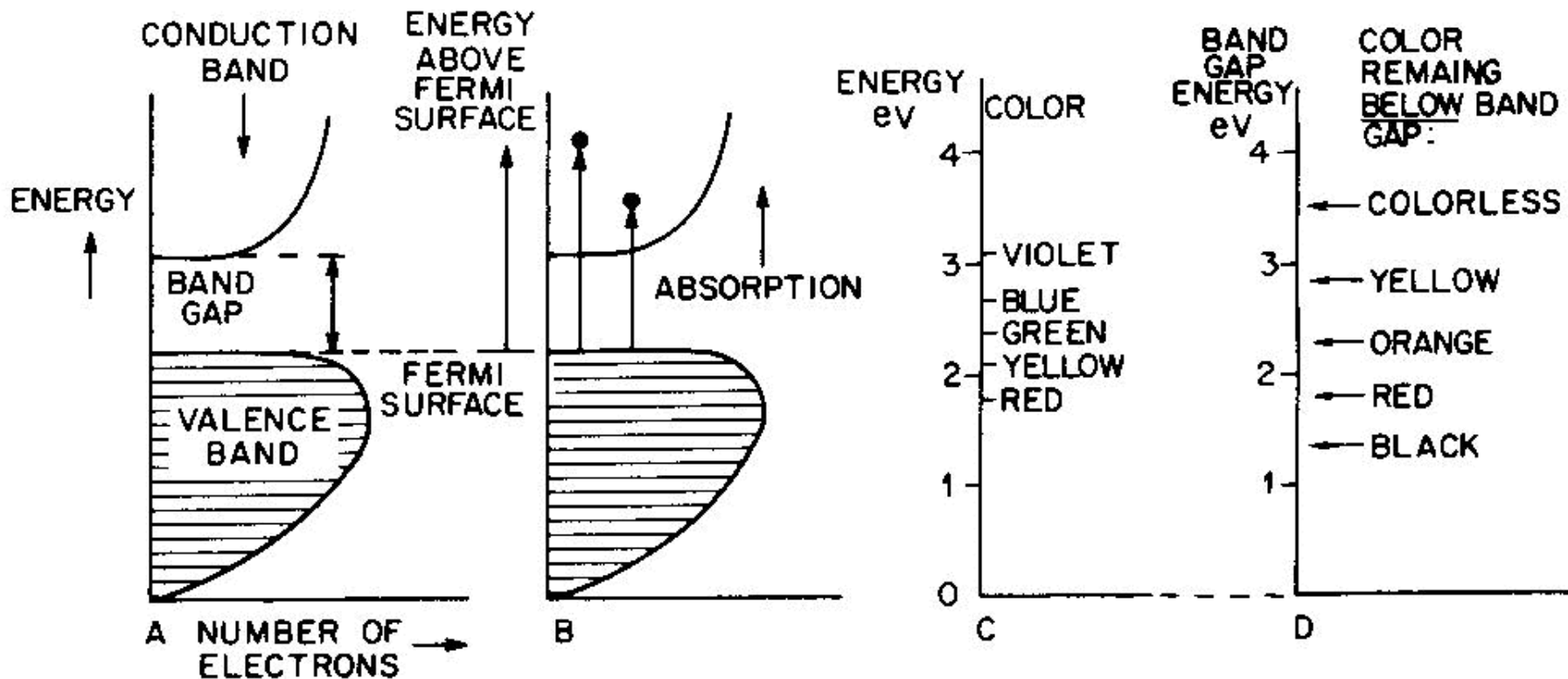


# Bande proibite in tipici semiconduttori III-V e Si





# 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

