

G



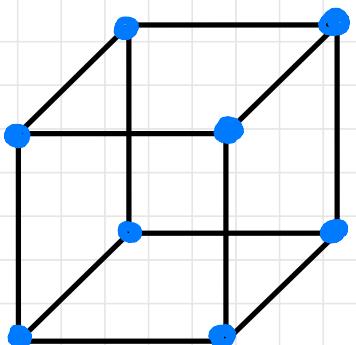
D



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CS

Atomi per cella:  $\frac{1}{8} \cdot 8 = 1$



VOLUME di celle unitarie:  $a^3$

VECTRI RETICOLI direzionali unitari:

$$\begin{cases} \vec{e}_1 = a \hat{u}_x \\ \vec{e}_2 = a \hat{u}_y \\ \vec{e}_3 = a \hat{u}_z \end{cases}$$

VECTRI RETICOLI inversi Unitari:

$$\begin{cases} \vec{b}_1 = \frac{2\pi}{a} \hat{u}_x \\ \vec{b}_2 = \frac{2\pi}{a} \hat{u}_y \\ \vec{b}_3 = \frac{2\pi}{a} \hat{u}_z \end{cases}$$

VECTRI RETICOLI direzionali elementare:

$$\begin{cases} \vec{e}_1 = a \hat{u}_x \\ \vec{e}_2 = a \hat{u}_y \\ \vec{e}_3 = a \hat{u}_z \end{cases}$$

$\alpha = \beta = \gamma = 90^\circ$

$\alpha' = \beta' = \gamma' = 90^\circ$

numero di coordinazione: 6

fattore di packaggio: 0.523

(FCA)

VECTRI RETICOLI inversi elementare:

$$\begin{cases} \vec{b}_1 = \frac{2\pi}{a} \hat{u}_x \\ \vec{b}_2 = \frac{2\pi}{a} \hat{u}_y \\ \vec{b}_3 = \frac{2\pi}{a} \hat{u}_z \end{cases}$$

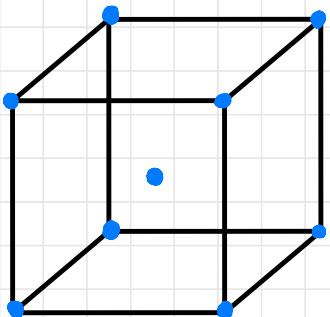
VOLUME di celle elementare:  $a^3$

BCC

$$\text{Atomi per cella: } 8 \cdot \frac{1}{8} + 1 = 2$$

VOLUME di rettangolo unitario:  $a^3$

VETTORI RETTICOLO di rettangolo unitario:



$$\begin{cases} \vec{a}_1 = a \hat{u}_x \\ \vec{a}_2 = a \hat{u}_y \\ \vec{a}_3 = a \hat{u}_z \end{cases}$$

$$\begin{cases} \vec{b}_1 = \frac{2\pi}{a} \hat{u}_x \\ \vec{b}_2 = \frac{2\pi}{a} \hat{u}_y \\ \vec{b}_3 = \frac{2\pi}{a} \hat{u}_z \end{cases}$$

VETTORI RETTICOLO inverso unitario:

VETTORI RETTICOLO di rettangolo elementare:

$$\begin{cases} \vec{a}'_1 = \frac{1}{2} (\vec{a}_2 + \vec{a}_3 - \vec{a}_1) \\ \vec{a}'_2 = \frac{1}{2} (\vec{a}_1 + \vec{a}_3 - \vec{a}_2) \\ \vec{a}'_3 = \frac{1}{2} (\vec{a}_1 + \vec{a}_2 - \vec{a}_3) \end{cases}$$

$$|\vec{a}'_1| = \frac{\sqrt{3}}{2} a$$

$$\alpha = \beta = \gamma = 109.47^\circ$$

$$\alpha = \beta = \gamma = 90^\circ$$

$$2R_0 = \sqrt{3} a$$

VETTORI RETTICOLO inverso elementare:

$$\begin{cases} \vec{b}'_1 = \frac{2\pi}{a} (\gamma + \hat{e}_2) \\ \vec{b}'_2 = \frac{2\pi}{a} (\lambda + \hat{e}_1) \\ \vec{b}'_3 = \frac{2\pi}{a} (\lambda + \gamma + \hat{e}_3) \end{cases}$$

VOLUME di rettangolo elementare:  $\frac{1}{2} a^3$

VOLUME inverso elementare  $16 \frac{\pi^3}{a^3}$

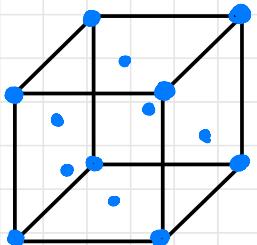
FCC

$$\text{Atomi per cella: } \frac{1}{8} \cdot 8 + \frac{1}{2} \cdot 6 = 1 + 3 = 4$$

VOLUME diretto unitario :  $a^3$

VECTRI reticolare diretto unitario :

$$\begin{cases} \vec{a}_1 = a \hat{u}_x \\ \vec{a}_2 = a \hat{u}_y \\ \vec{a}_3 = a \hat{u}_z \end{cases}$$



$$\alpha = \beta = \gamma = 90^\circ$$

FCA: 0.74

$$2 R_0 = \sqrt{2} a$$

VECTRI reticolare diretto elementare :

$$\begin{cases} \vec{a}_1 = \frac{1}{2} (\vec{a}_2 + \vec{a}_3) \\ \vec{a}_2 = \frac{1}{2} (\vec{a}_1 + \vec{a}_3) \\ \vec{a}_3 = \frac{1}{2} (\vec{a}_1 + \vec{a}_2) \end{cases}$$

$$|\vec{a}_1| = \frac{1}{\sqrt{2}} a$$

VECTRI reticolare inverso elementare :

$$\begin{cases} \vec{b}_1 = \frac{2\pi}{a} (-\hat{x} + \hat{y} + \hat{z}) \\ \vec{b}_2 = \frac{2\pi}{a} (\hat{x} - \hat{y} + \hat{z}) \\ \vec{b}_3 = \frac{2\pi}{a} (\hat{x} + \hat{y} - \hat{z}) \end{cases}$$

Posizione atomi base elementare :

$$\begin{cases} (0, 0, 0) \\ (\frac{1}{2}, \frac{1}{2}, 0) \\ (\frac{1}{2}, 0, \frac{1}{2}) \\ (0, \frac{1}{2}, \frac{1}{2}) \end{cases}$$

VOLUME diretto elementare :  $\frac{1}{4} a^3$

VOLUME inverso elementare :  $\frac{32\pi^3}{a^3}$

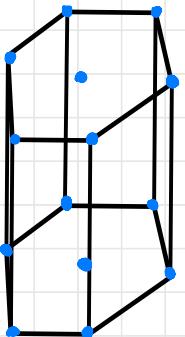
$$\alpha' = \beta' = \gamma' = 60^\circ$$

## ESAGONALE AD IMPIACCHETAMENTO STRETTO

$$\text{Atomi per cella: } 12 \cdot \frac{1}{8} + 2 \cdot \frac{1}{2} = 1 + \frac{3}{2} = \frac{5}{2}$$

$$\text{Volume diretto unitario: } \frac{a^2 c}{2} \sqrt{3}$$

Vettori reticollo diretto unitario:



Vettori reticollo inverso unitario:

Vettori reticollo diretto elementare:

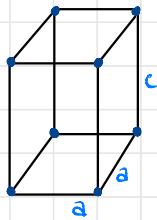
$$\begin{cases} \vec{a}_1 = a \hat{u}_x \\ \vec{a}_2 = \frac{a}{2} \hat{u}_x + \frac{\sqrt{3}}{2} a \hat{u}_y \\ \vec{a}_3 = c \hat{u}_z \end{cases}$$

Vettori reticollo inverso elementare:

$$\begin{cases} \vec{b}_1 = \frac{2\pi}{a} \left( \hat{x} - \frac{1}{\sqrt{3}} \hat{y} \right) \\ \vec{b}_2 = \frac{2\pi}{a} \frac{2}{\sqrt{3}} \hat{y} \\ \vec{b}_3 = \frac{2\pi}{c} \hat{z} \end{cases}$$

$$\text{Volume diretto elementare: } \sqrt{2} a^3$$

## Tetragonal

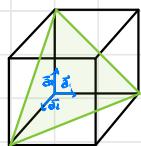


$$\left\{ \begin{array}{l} \vec{a}_1 = a \hat{x} \\ \vec{a}_2 = a \hat{y} \\ \vec{a}_3 = c \hat{z} \end{array} \right.$$

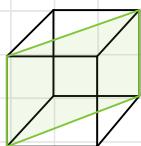
$$\left\{ \begin{array}{l} \vec{b}_1 = \frac{2\pi}{a} \hat{x} \\ \vec{b}_2 = \frac{2\pi}{a} \hat{y} \\ \vec{b}_3 = \frac{2\pi}{c} \hat{z} \end{array} \right.$$

Esempi di piani indicizzati con Miller

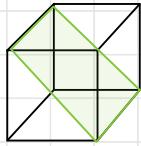
$$\{1\bar{1}1\}$$



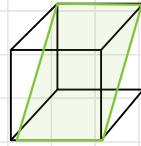
$$\{1,\bar{1},0\}$$



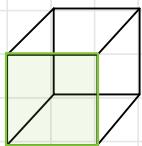
$$\{1,0,\bar{1}\}$$



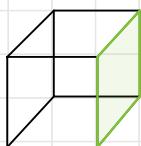
$$\{0,1,1\}$$



$$\{0\bar{1}0\}$$



$$\{\bar{1}00\}$$



$$\{00\bar{1}\}$$

