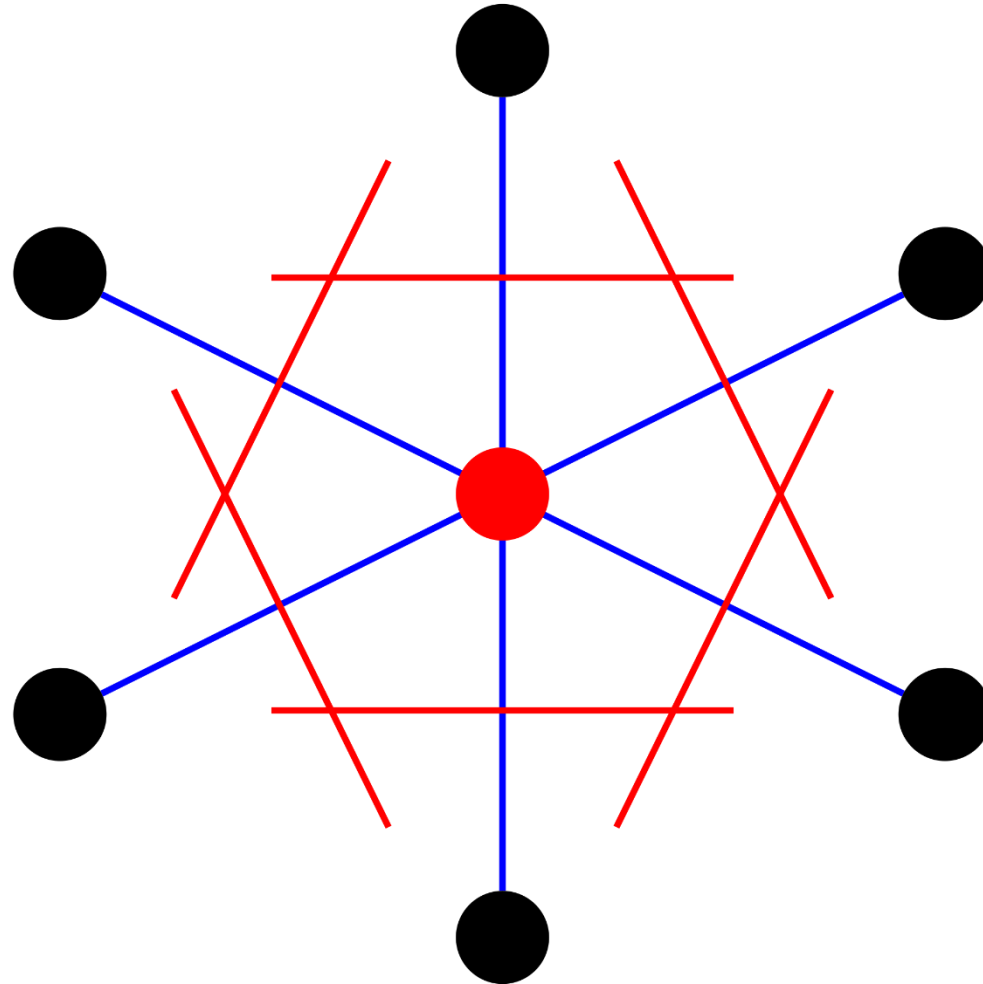


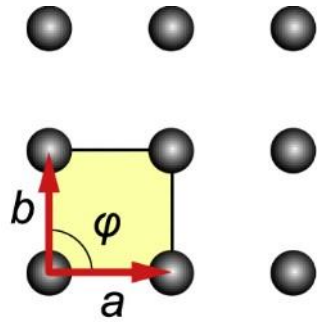
PHY481/581

Wed. Oct. 17, 2018

Wigner-Seitz Cell

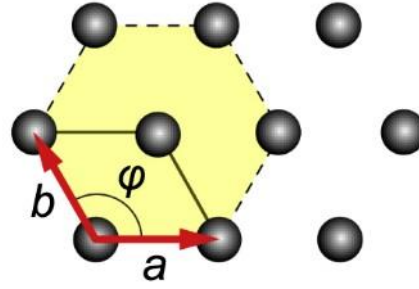


2D Bravais Lattice Types (5)



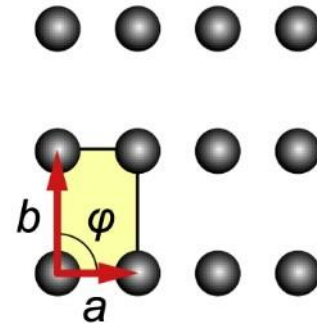
$$|a| = |b|, \varphi = 90^\circ$$

Square



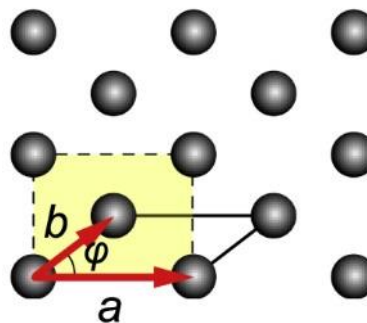
$$|a| = |b|, \varphi = 120^\circ$$

Hexagonal



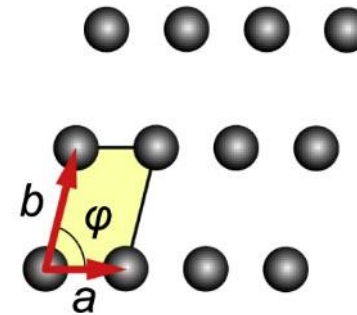
$$|a| \neq |b|, \varphi = 90^\circ$$

Rectangular



$$|a| \neq |b|, \varphi \neq 90^\circ$$

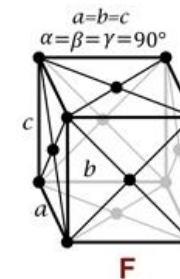
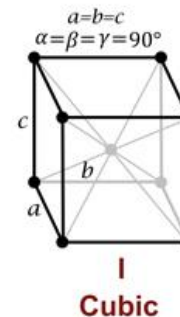
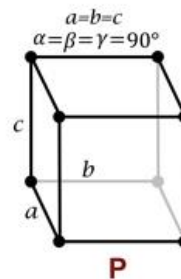
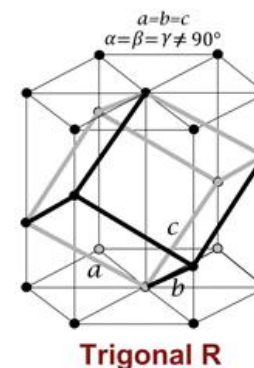
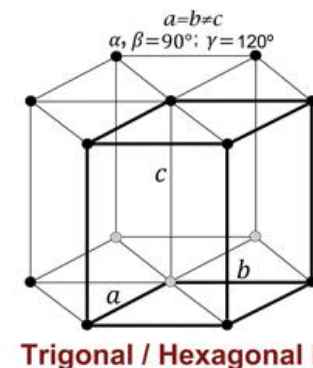
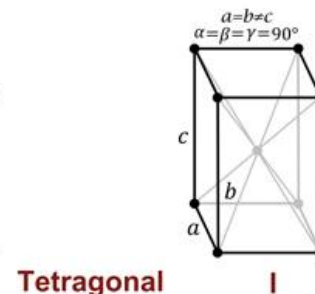
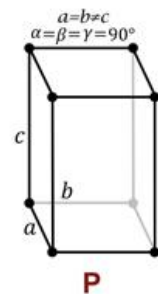
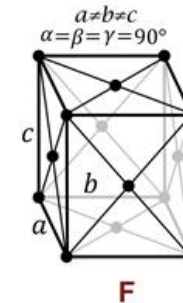
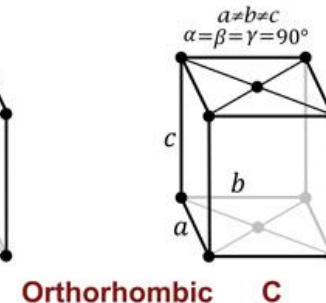
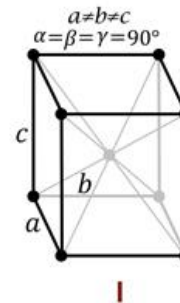
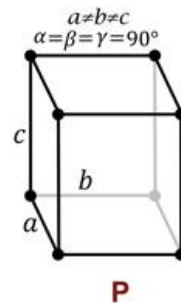
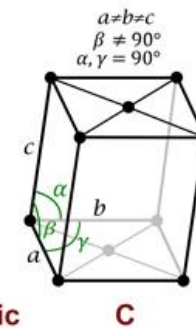
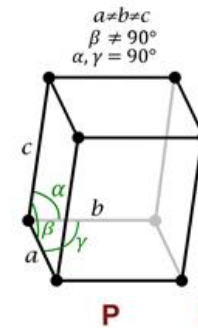
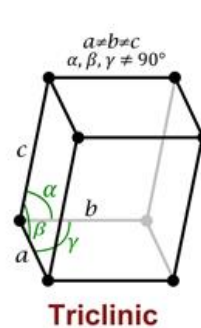
Centerd Rectangular



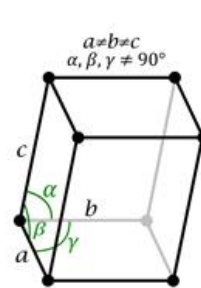
$$|a| \neq |b|, \varphi \neq 90^\circ$$

Oblique

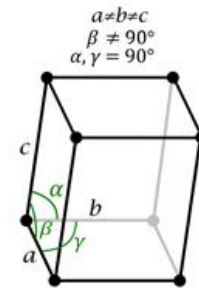
3D Bravais Lattice Types (14)



Cubic Crystals

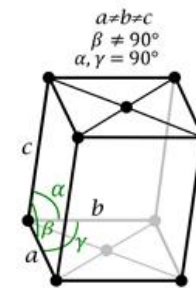


Triclinic

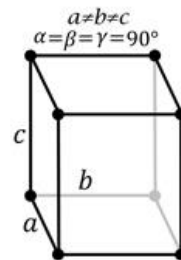


P

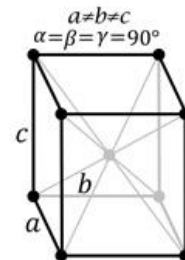
Monoclinic



C

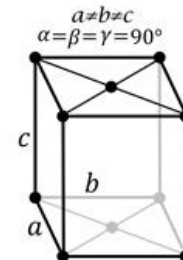


P

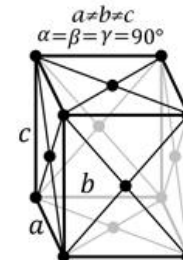


I

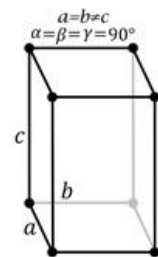
Orthorhombic



C

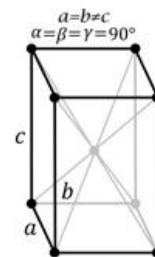


F

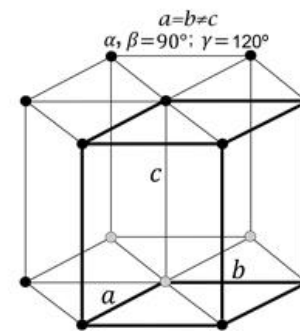


P

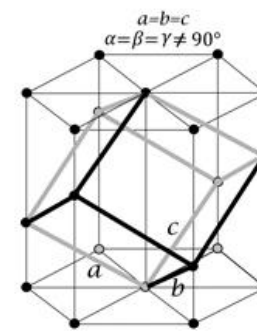
Tetragonal



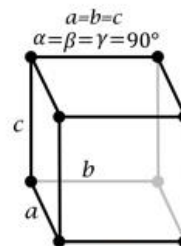
I



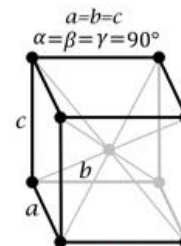
Trigonal / Hexagonal P



Trigonal R

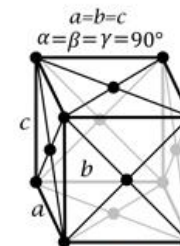


P



I

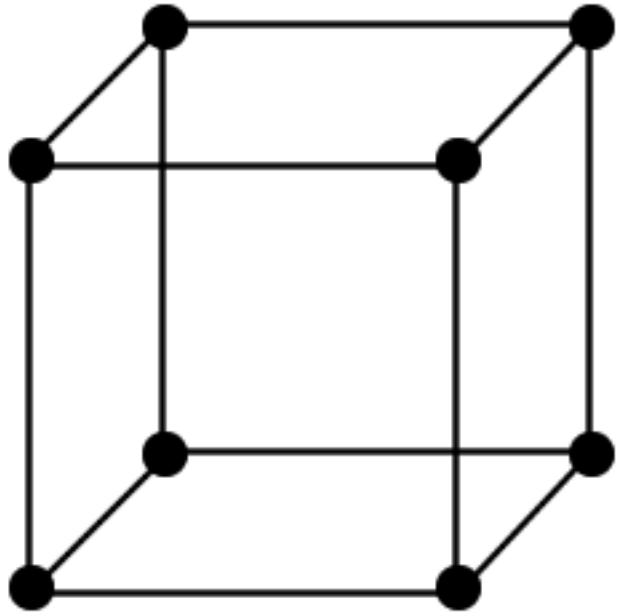
Cubic



F

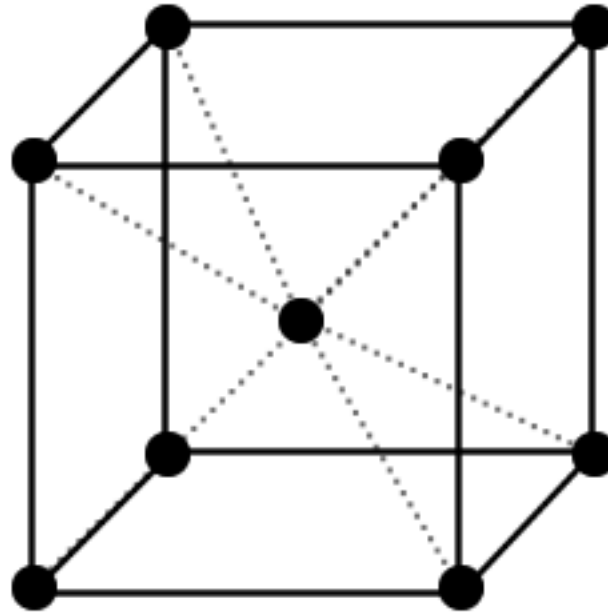


Cubic Crystals



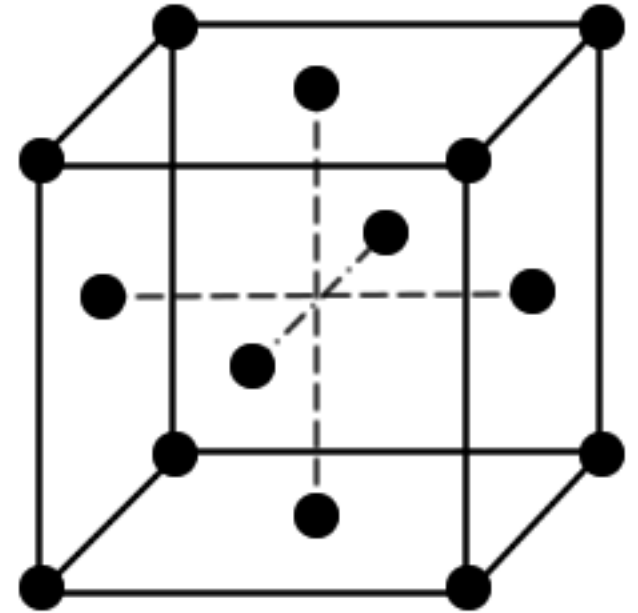
P (Primitive)

BCC

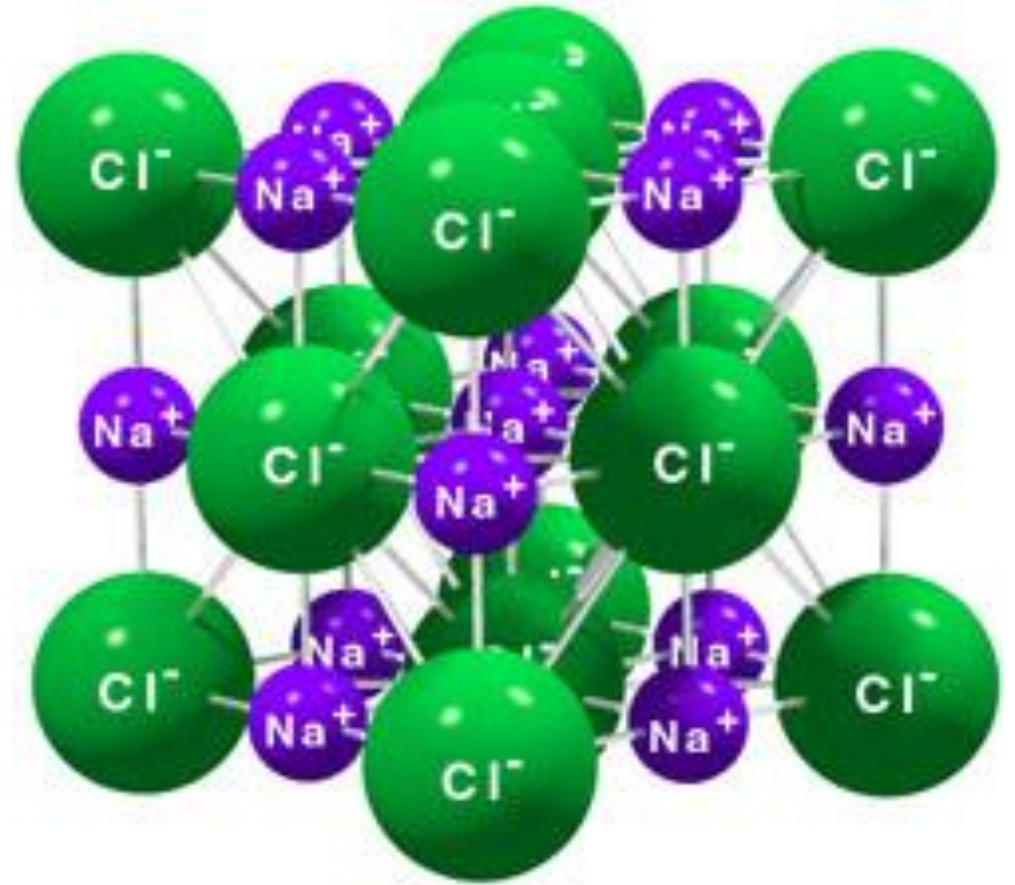


I (Body)

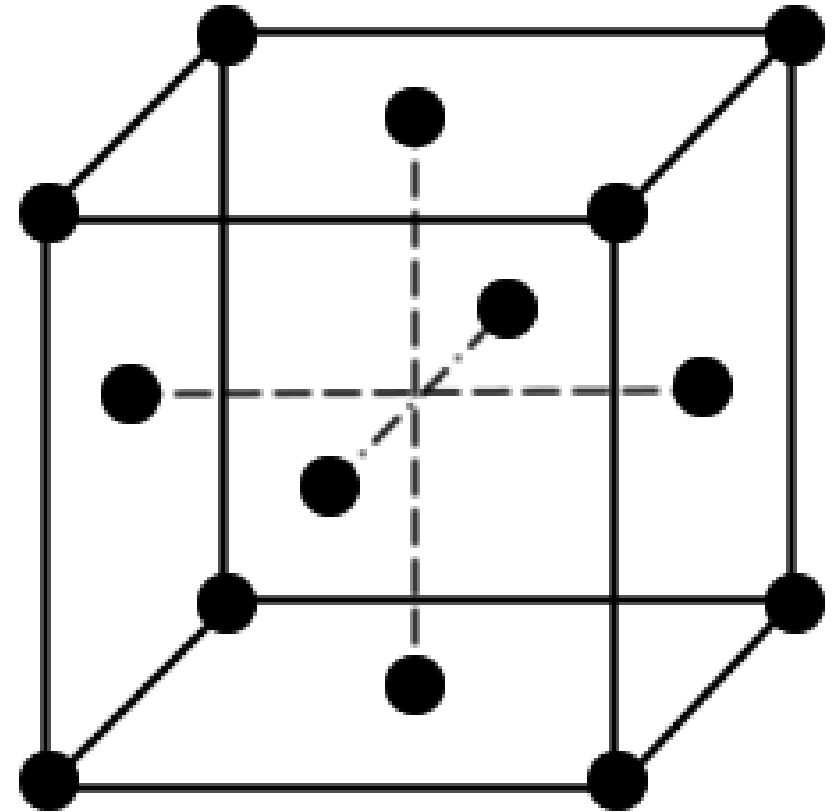
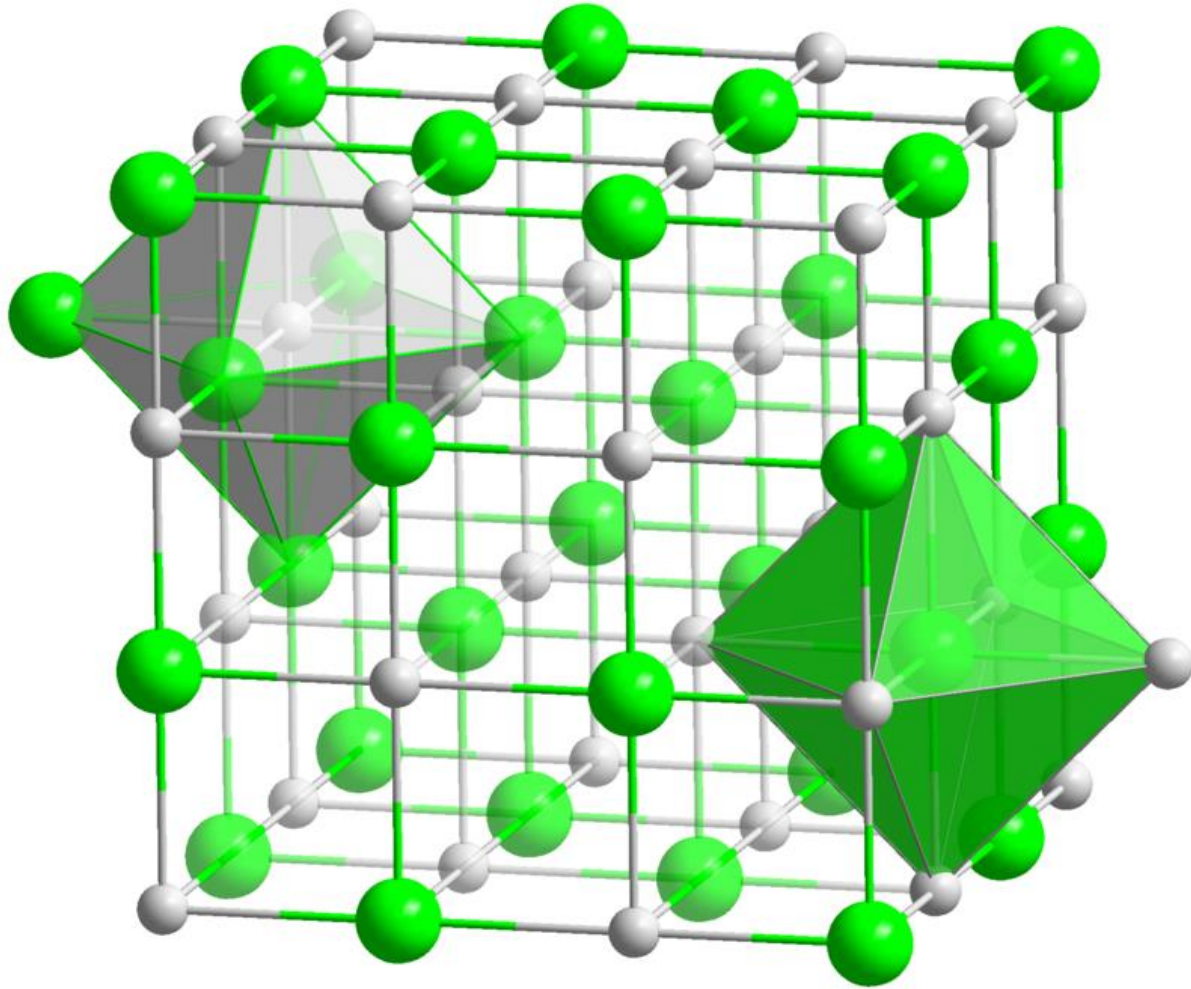
FCC



F (Face)

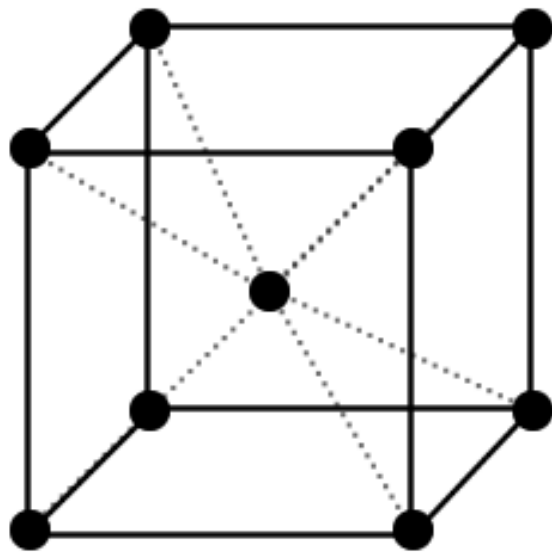


Face-centered cubic (fcc) lattice with a two-atom basis or as two interpenetrating face centered cubic lattices.

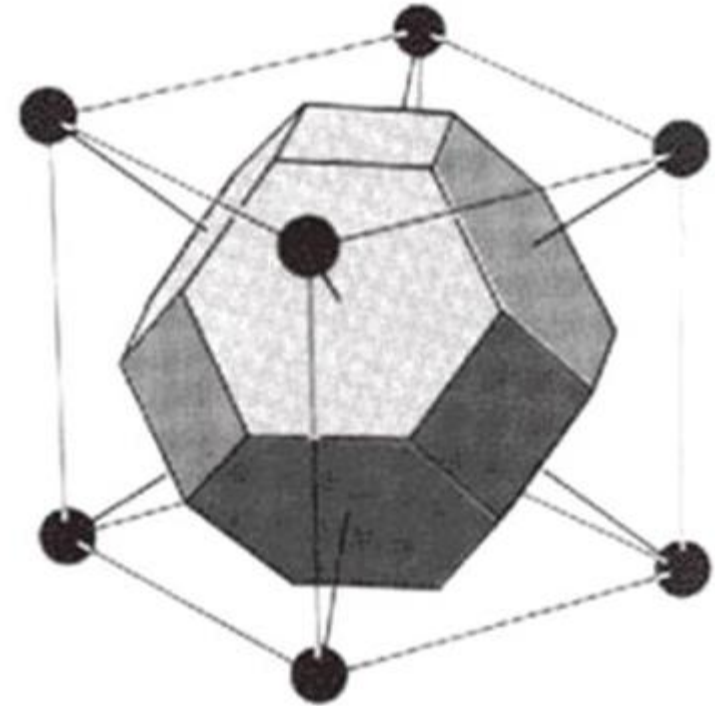
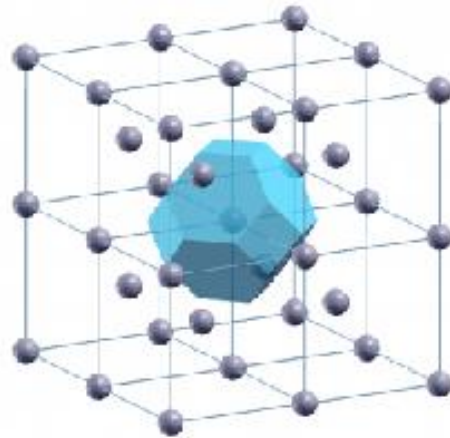


Fcc

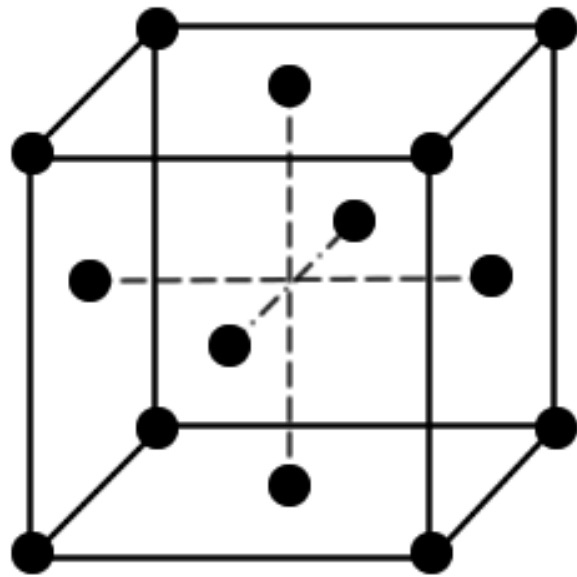
Wigner-Seitz Cell for BCC



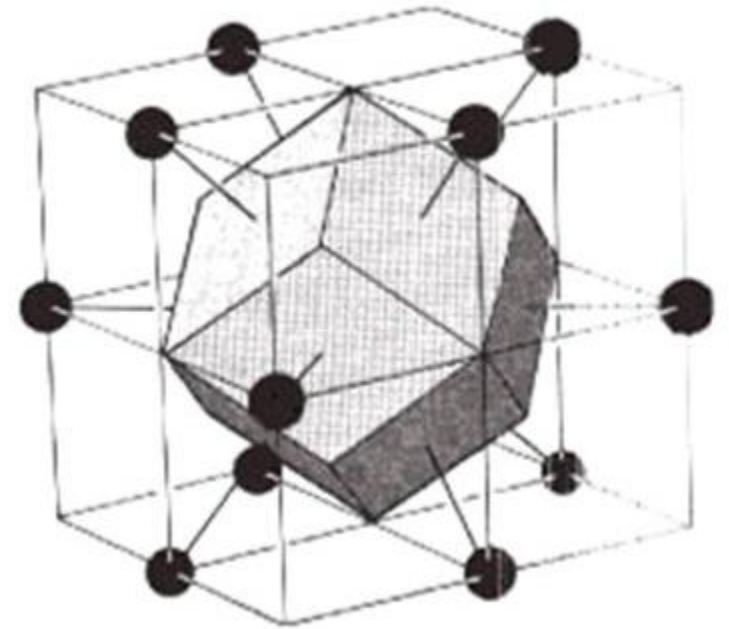
I (Body)



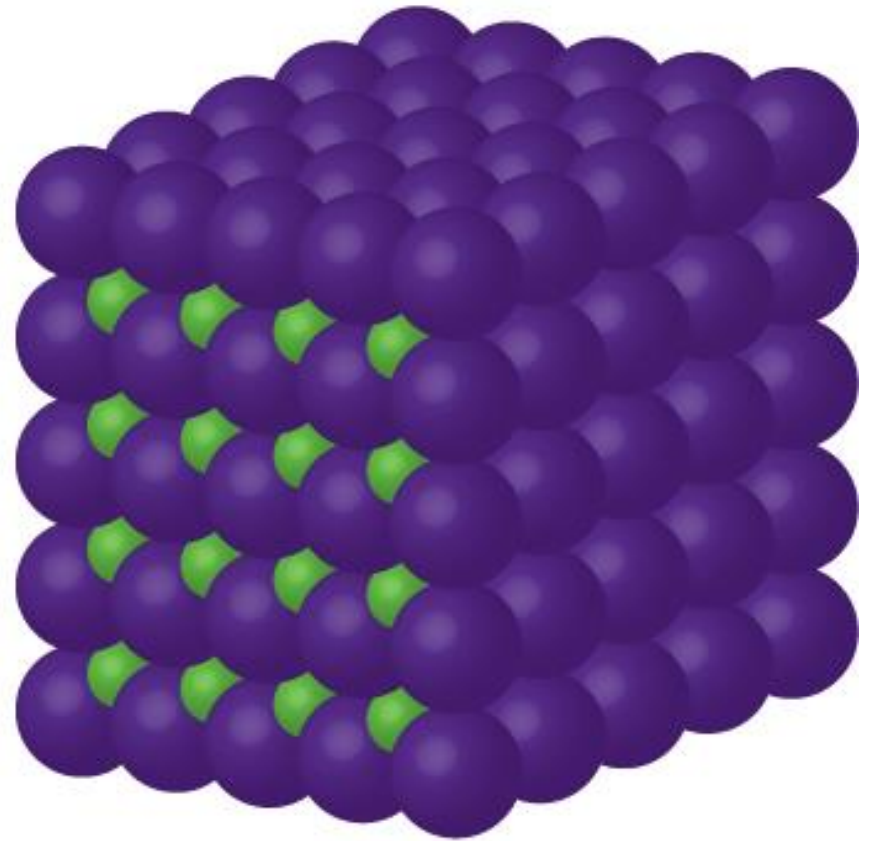
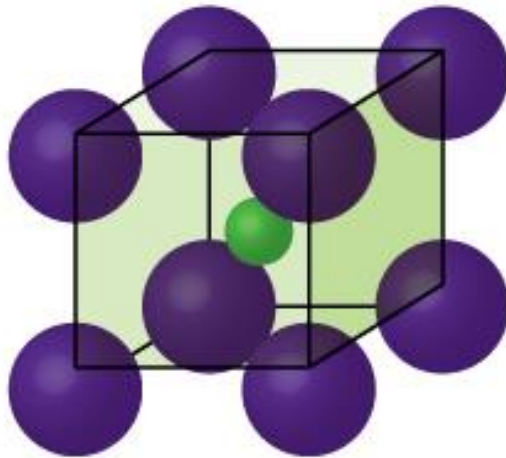
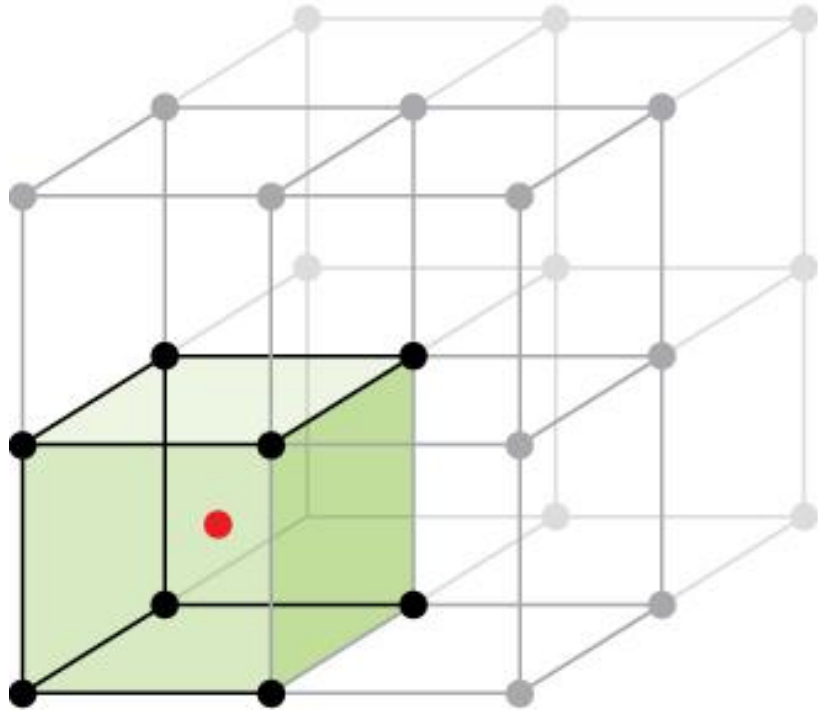
Wigner-Seitz Cell for BCC



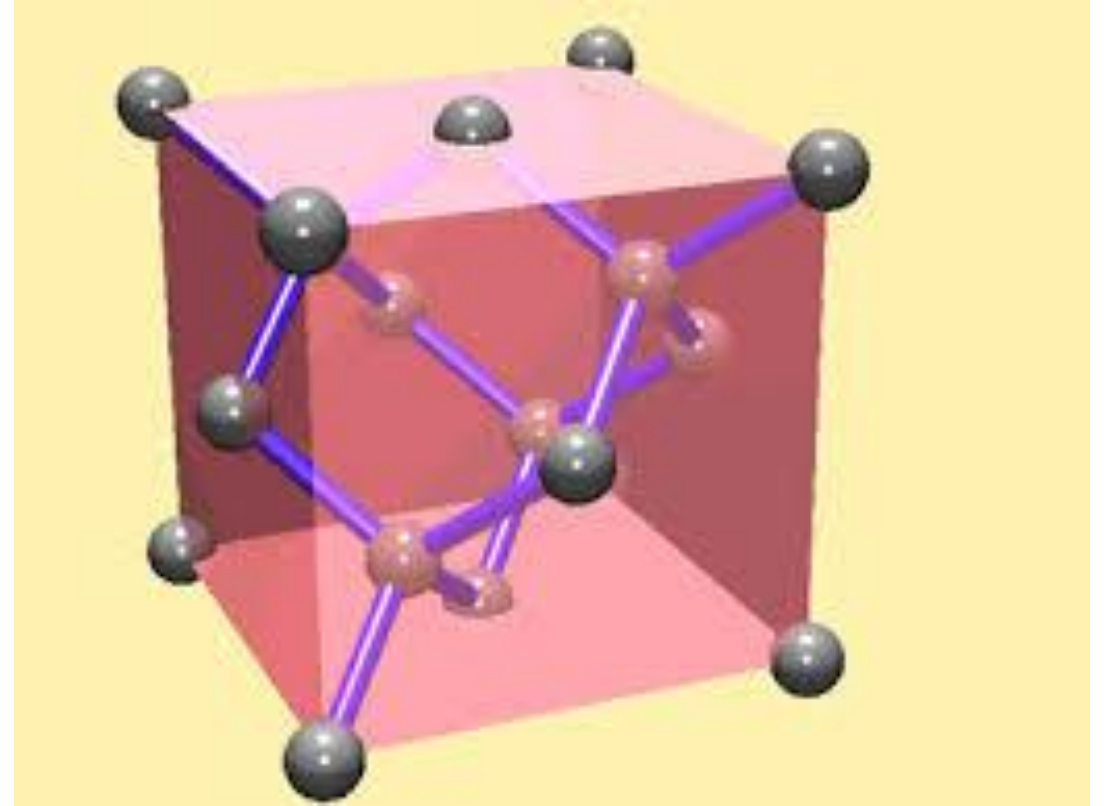
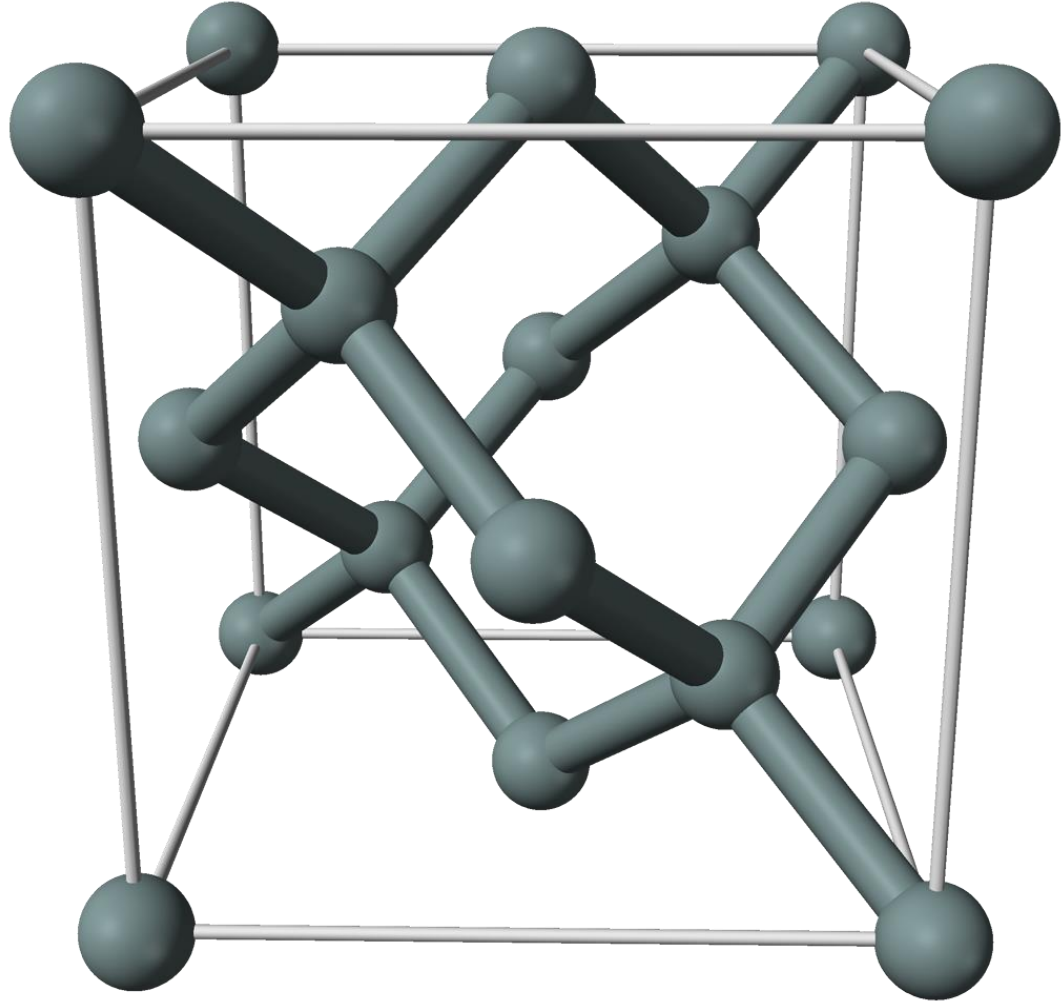
F (Face)



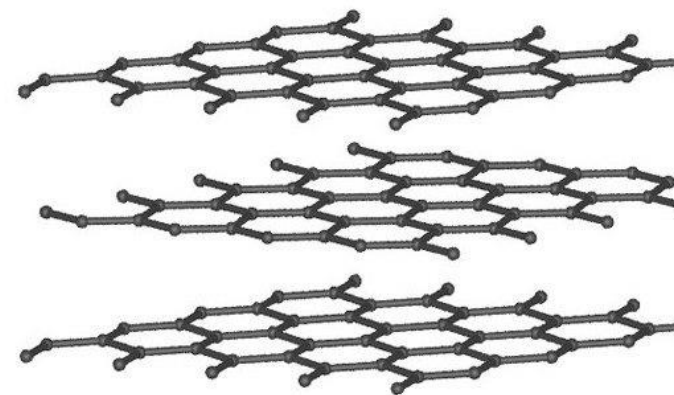
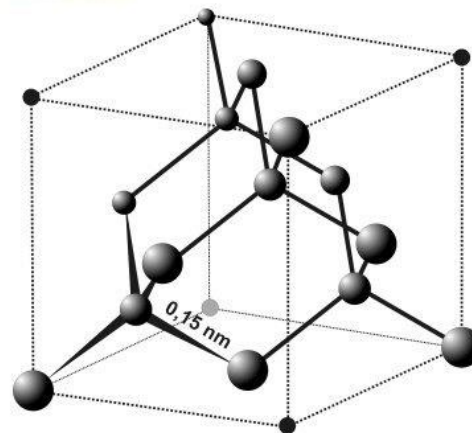
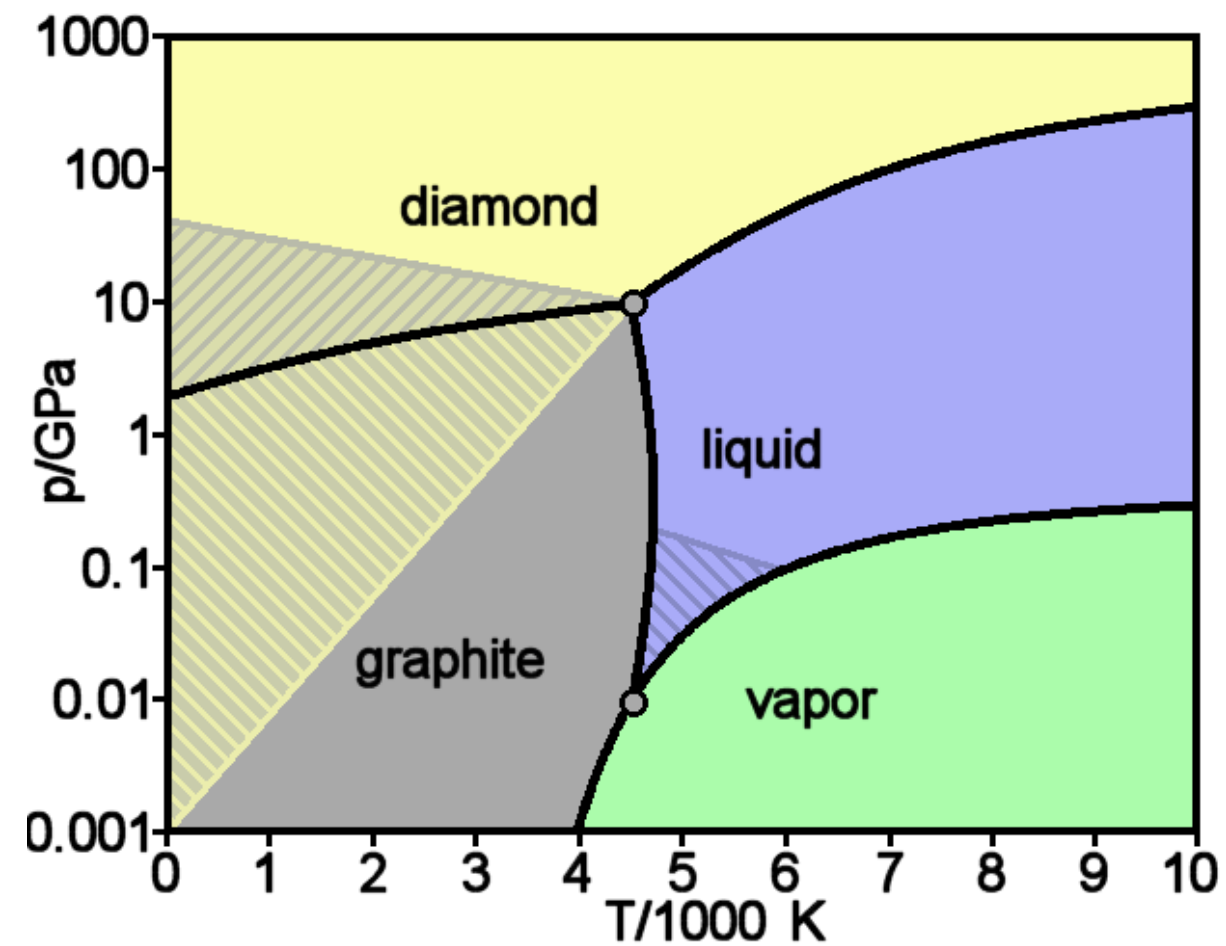
CsCl



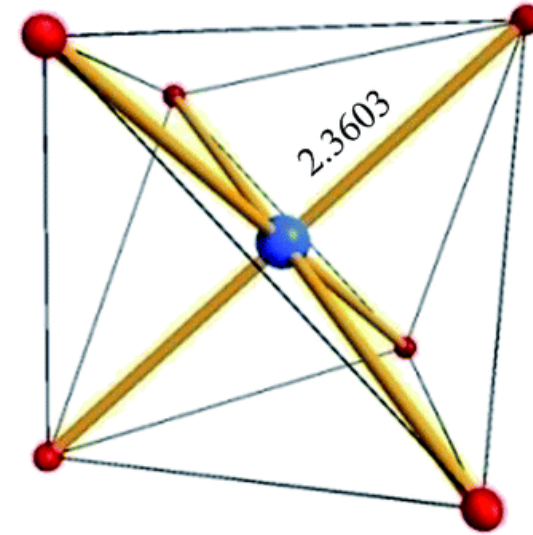
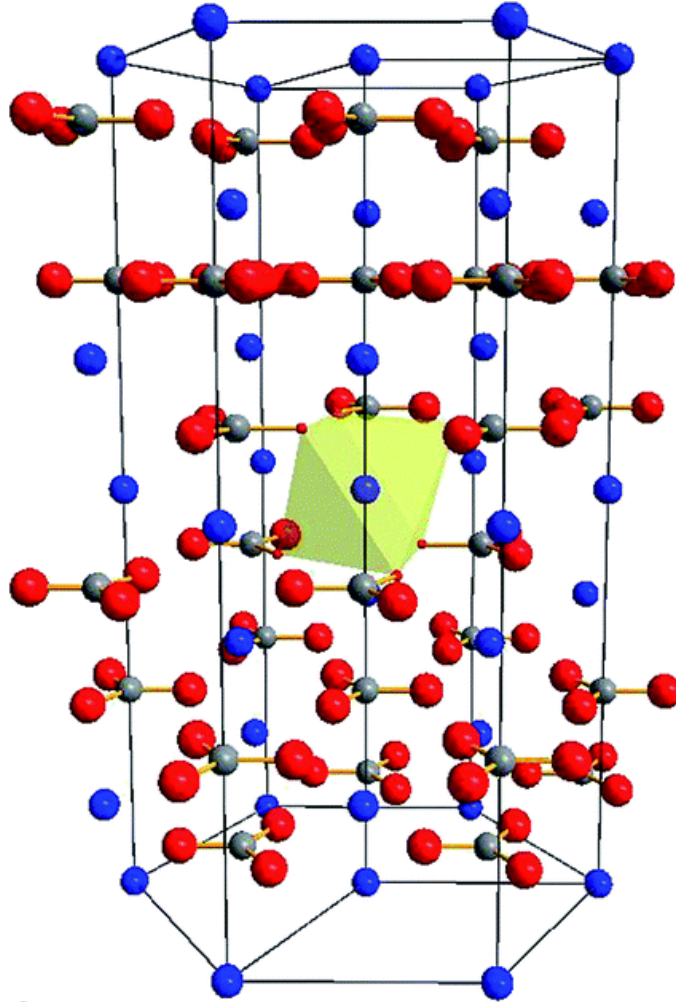
Diamond



Diamond



Calcite – trigonal hexagonal

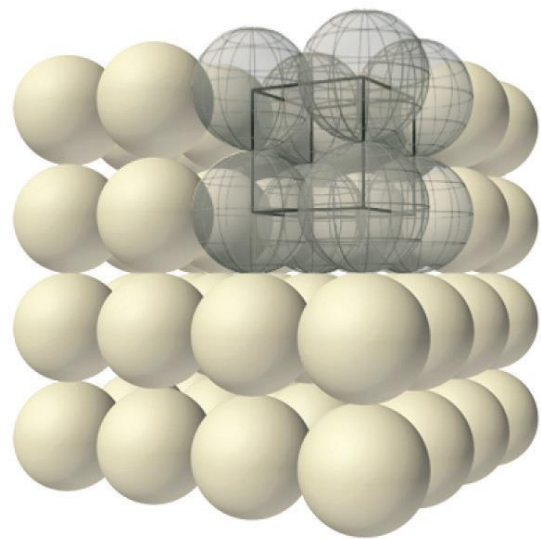
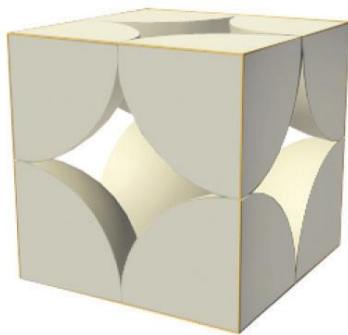
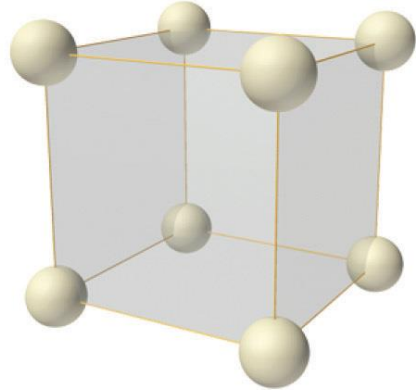


Calcite – “birefringence”

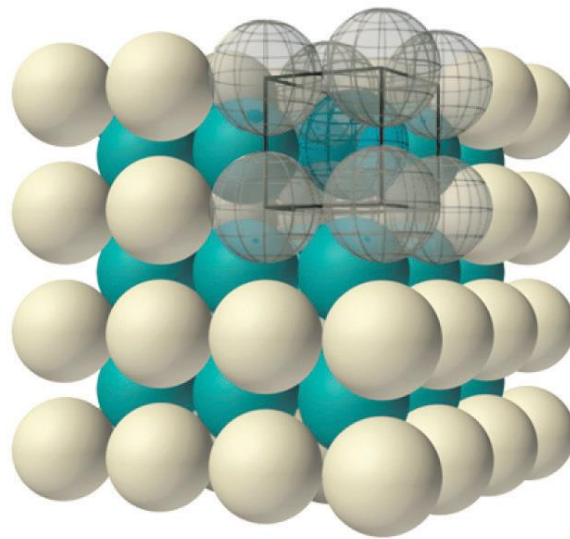
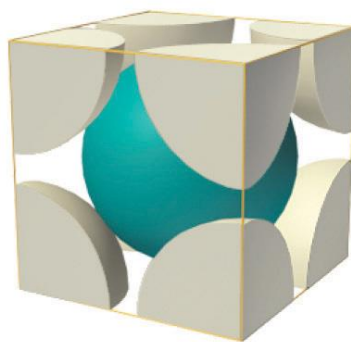
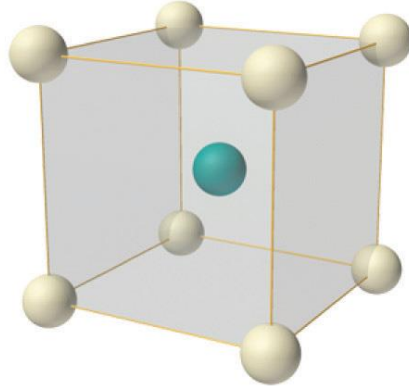


Bismuth Hopper Crystal

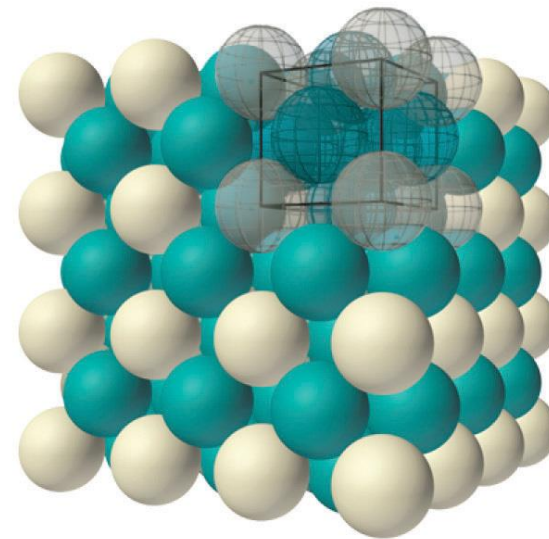
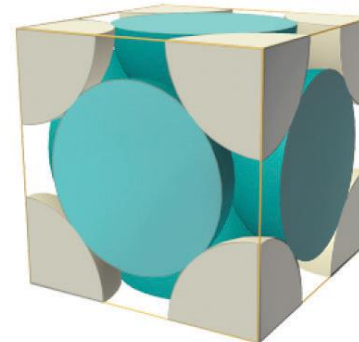
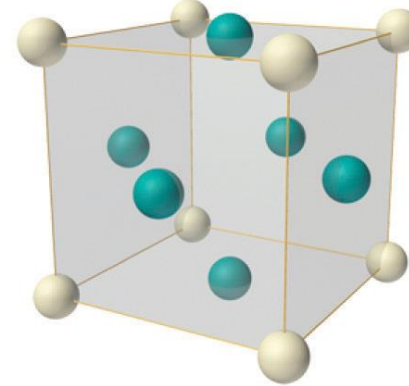




(a) Simple cubic



(b) Body-centered cubic



(c) Face-centered cubic