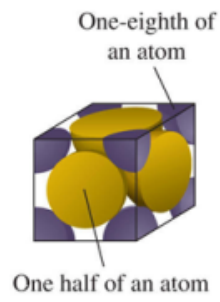
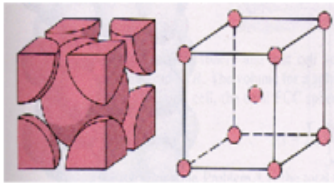
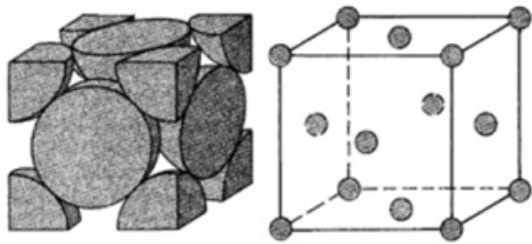


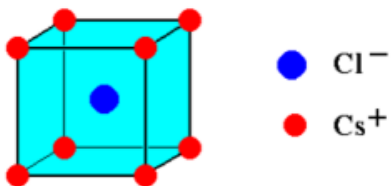
Determining the empirical formula of a crystalline solid:

Use the # of ions that fall within the unit cell

Position in unit cell	Fraction in unit cell
Center	1
Face	$\frac{1}{2}$
Edge	$\frac{1}{4}$
Corner	$\frac{1}{8}$



Using the unit cell, justify the empirical formula for cesium chloride.



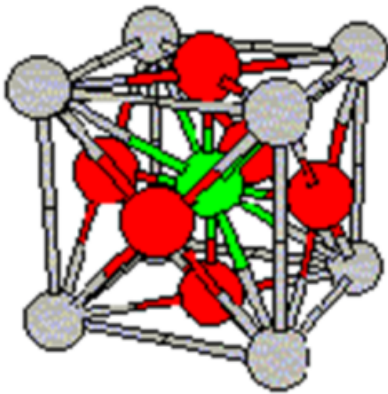
unit cell Cesium Chloride

$1 \text{ Cl}^- \text{ inside} = 1 \text{ Cl}^-$

$8 \text{ corners} \left(\frac{\frac{1}{8} \text{ Cs}^+}{\text{corner}} \right) = 1 \text{ Cs}$



Determine the empirical formula for the following unit cell:



Gray—calcium
Red—oxygen
Green—titanium

$$\begin{aligned} & 1 \text{ Ti inside} = 1 \text{ Ti} \\ & 8 \text{ corners} \left(\frac{\frac{1}{8} \text{ Ca}}{\text{corner}} \right) = 1 \text{ Ca} \\ & 6 \text{ faces} \left(\frac{\frac{1}{2} \text{ O}}{\text{face}} \right) = 3 \text{ O} \\ & \text{Ca Ti O}_3 \end{aligned}$$

$$74. \left. \begin{array}{l} 1 \text{ Xe inside} = 1 \text{ Xe} \\ 8 \text{ corners} \left(\frac{1/8 \text{ Xe}}{\text{corner}} \right) = 1 \text{ Xe} \end{array} \right\} 2 \text{ Xe}$$

$$\left. \begin{array}{l} 4 \text{ edges} \left(\frac{(4 F) 2}{\text{edge}} \right) = 2 F \\ 2 F \text{ inside} = 2 F \end{array} \right\} 4 F$$

\nearrow $2 F$ on each edge
 \downarrow 1



62. 2 As inside = 2 As

$$\left. \begin{array}{l} 8 \text{ corners } \left(\frac{\frac{1}{8} \text{ Ni}}{\text{corner}} \right) = 1 \text{ Ni} \\ 4 \text{ edges } \left(\frac{\frac{1}{4} \text{ Ni}}{\text{edges}} \right) = 1 \text{ Ni} \end{array} \right\} 2 \text{ Ni}$$

