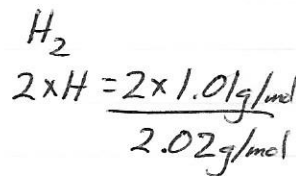## Molar Volume 2-step conversions
Sample Problem

(A) What volume at STP is occupied by 750g of $H_{2(g)}$?

mass $\overset{①}{\rightarrow}$ moles $\overset{②}{\rightarrow}$ volume

H_2
$2 \times H = 2 \times 1.0$ g/mol
$\overline{\hspace{1cm}}$
2.02 g/mol

① $750 g\, H_2 \times \dfrac{1\, mol}{2.02g} = 340.9\, mol\, H_2$

② $340.9\, mol\, H_2 \times \dfrac{22.4\, L}{1\, mol} = 7636.2\, L\, H_2$

(B) How many molecules are in $38.7 L$ of $CO_{2(g)}$ at STP?

volume $\overset{①}{\longrightarrow}$ moles $\overset{②}{\longrightarrow}$ particles

① $38.7\, L\, CO_2 \times \dfrac{1\, mol}{22.4\, L} = 1.73\, mol\, CO_2$

② $1.73\, mol\, CO_2 \times \dfrac{6.02 \times 10^{23}\, molecules}{1\, mol} = 1.04 \times 10^{24}\, molecules\, CO_2$

(C) What is the mass of $H_{2(g)}$ in a weathe balloon with a volume of $168 L$ at STP?

volume $\overset{①}{\longrightarrow}$ moles $\overset{②}{\longrightarrow}$ mass

① $168 L\, H_2 \times \dfrac{1\, mol}{22.4\, L} = 7.5\, mol\, H_2$

② $7.5\, mol\, H_2 \times \dfrac{2.02g}{1\, mol} = 15.15 g\, H_2$

H_2
$2 \times H = 2 \times 1.01$ g/mol
$\overline{\hspace{1cm}}$
2.02 g/mol