11-2 Notes - Mole-to-Mole Stoich.

* Effective recipes require balanced equations

Mole-to-Mole conversions using Stoich.

ex) $2\,K_{(s)} + 2\,H_2O_{(l)} \rightarrow 2\,KOH_{(aq)} + 1\,H_{2\,(g)}$

* How much $H_{2\,(g)}$ is produced if only 0.04 mol of $K_{(s)}$ is used?
  - since known value is in moles and we want to solve for moles of H_2, we use mole-to-mole conversion

- we will use the mole ratios we learned yesterday to solve this, but only 1 of them is needed. which one?

.04 mol K

- 2 mol H_2 to 1 mol K or $\frac{1\text{ mol } H_2}{2\text{ mol K}}$

Use this equation: moles of known $\times \frac{\text{moles of unknown}}{\text{moles of known}}$ = moles of unknown

- for problem above - $0.04\,\text{mol K} \times \frac{1\text{ mol } H_2}{2\text{ mol K}} = 0.02\text{ mol } H_2$ $\left(0.04 \times \frac{1}{2}\right)$

ex) $4\,Cr + 3\,O_2 \rightarrow 2\,Cr_2O_3$ - How much CrO_3 is produced, when $Cr = 4.58$ mol?
* ratio needed = $\frac{2\text{ mol } Cr_2O_3}{4\text{ mol Cr}}$

- use formula: $4.58\,\text{mol Cr} \times \frac{2\text{ mol } Cr_2O_3}{4\text{ mol Cr}} = 2.29\text{ mol } Cr_2O_3$ $\left(4.58 \times \frac{2}{4}\right)$

ex) $2\,LiOH + 1\,CO_2 \rightarrow 1\,Li_2CO_3 + 1\,H_2O$ - How much CO_2 produced when $LiOH = 42.0$ mol?
* ratio needed = $\frac{1\text{ mol } CO_2}{2\text{ mol LiOH}}$

- Use formula: $42.0\,\text{mol LiOH} \times \frac{1\text{ mol } CO_2}{2\text{ mol LiOH}} = 21.0\text{ mol } CO_2$ $\left(42 \times \frac{1}{2}\right)$