Stoichiometric Calculations: mole-mole

Example: If you put 0.0400 mol of K into water, how much hydrogen gas will be produced?

$$2K(s) + 2H_2O(l) \rightarrow 2KOH(aq) + H_2(g)$$

Mole ratio between K and KOH is $\frac{2 \text{ mol K}}{1 \text{ mol } H_2}$ or $\frac{1 \text{ mol } H_2}{2 \text{ mol K}}$

$$\text{moles of known} \times \frac{\text{moles of unknown}}{\text{moles of known}}$$

$$0.0400 \text{ mol K} \times \frac{1 \text{ mol } H_2}{2 \text{ mol K}} = 0.0200 \text{ mol } H_2$$