

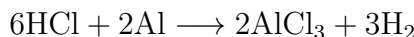
Chemistry Honors Study Guide

Test 3 S2

Test date: TBD

1 Gasses and Heat in Stoichiometry

Gasses



At STP, how many *ml* of H_2 gas are produced from 12 *g* of solid Al? (1 *mol* = 22.4 *L* at STP)

Using stoichiometry:

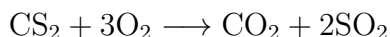
$$\begin{aligned} (12 \text{ g Al}) \times \left(\frac{1 \text{ mol Al}}{26.98 \text{ g Al}} \right) \times \left(\frac{3 \text{ mol H}_2}{2 \text{ mol Al}} \right) \times \left(\frac{22.4 \text{ L H}_2}{1 \text{ mol H}_2} \right) \times \left(\frac{1000 \text{ ml}}{1 \text{ L}} \right) \\ = \boxed{14944.4 \text{ ml}} \end{aligned}$$

Heats of Formation

ΔH_f is the heat absorbed/released when compounds are formed from elemental units. The ΔH_f of elements, including diatomic elements, is always 0.

Heats of formation equation:

$$\Delta H_{\text{rxn}} = \sum \Delta H_{\text{f(products)}} - \Delta H_{\text{f(reactants)}} \quad (1)$$



Find the heat of formation given the following:

$$\Delta H_f(\text{CO}_2) = -393.5 \frac{\text{kJ}}{\text{mol}}$$

$$\Delta H_f(\text{SO}_2) = -296.8 \frac{\text{kJ}}{\text{mol}}$$

$$\Delta H_f(\text{CS}_2) = 87.9 \frac{\text{kJ}}{\text{mol}}$$

Solution: Using 1:

$$\begin{aligned} & [-393.5 + 2(-296.8)] - [3(0) + 87.9] \\ &= \boxed{1075 \frac{kJ}{mol}} \end{aligned}$$