Quiz 5.2 – Limiting Reactant

Name: Key

For *all* questions, consider the following reaction: $2\,Al + 6\,HCl \longrightarrow 2\,AlCl_3 + 3\,H_2$

0.13g + 0g + 1.83g + 0.02g = 2.00g

Question 1 (2 points)

If you 0.500 *g* of Al with 1.500 *g* of HCl, which reactant will be the limiting reactant?

$$0.500\text{ g Al} \left| \frac{1\text{ mol Al}}{26.98\text{ g Al}} \right| \frac{2\text{ mol AlCl}_3}{2\text{ mol Al}} \left| \frac{133.34\text{ g AlCl}_3}{1\text{ mol AlCl}_3} \right| = 2.47\text{ g AlCl}_3$$

smaller!

$$1.500\text{ g HCl} \left| \frac{1\text{ mol HCl}}{36.46\text{ g HCl}} \right| \frac{2\text{ mol AlCl}_3}{6\text{ mol HCl}} \left| \frac{133.34\text{ g AlCl}_3}{1\text{ mol AlCl}_3} \right| = 1.83\text{ g AlCl}_3$$

HCl is Limiting

Question 2 (2 points)

How many *g* of each product will be produced?

1.83 g $AlCl_3$

$$1.500\text{ g HCl} \left| \frac{1\text{ mol HCl}}{36.46\text{ g HCl}} \right| \frac{3\text{ mol H}_2}{6\text{ mol HCl}} \left| \frac{2.02\text{ g H}_2}{1\text{ mol H}_2} \right| = 0.0416\text{ g H}_2$$

Question 3 (1 point)

How many *g* of the excess reactant will remain after the reaction?

$$1.500\text{ g HCl} \left| \frac{1\text{ mol HCl}}{36.46\text{ g HCl}} \right| \frac{2\text{ mol Al}}{6\text{ mol HCl}} \left| \frac{26.98\text{ g Al}}{1\text{ mol Al}} \right| = 0.370\text{ g Al Consumed}$$

0.500 g A

0.130 g Al remain