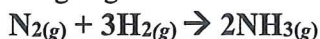


Quiz 12.3 (V-A)

(Honors Chemistry)

1a.) What is the limiting reagent if 79.3 grams of nitrogen gas reacts with 84.7 grams of hydrogen gas?LR: N₂

$$\frac{79.3\text{g N}_2}{28\text{g N}_2} \times \frac{1\text{mol N}_2}{1\text{mol N}_2} \times \frac{3\text{mol H}_2}{1\text{mol N}_2} \times \frac{2\text{g H}_2}{1\text{mol H}_2} = 17.0\text{g H}_2$$

$$\frac{84.7\text{g H}_2}{2\text{g H}_2} \times \frac{1\text{mol H}_2}{3\text{mol H}_2} \times \frac{1\text{mol N}_2}{1\text{mol N}_2} \times \frac{28\text{g N}_2}{1\text{mol N}_2} = 395\text{g N}_2$$

b.) What is the excess reagent and how much excess is present?ER: 67.7g H₂c.) Assuming STP, how many liters of ammonia (NH₃) can be produced using the information in 1a?

$$\frac{79.3\text{g N}_2}{28\text{g N}_2} \times \frac{1\text{mol N}_2}{1\text{mol N}_2} \times \frac{2\text{mol NH}_3}{1\text{mol N}_2} \times \frac{22.4\text{L NH}_3}{1\text{mol NH}_3} = \boxed{127\text{ L NH}_3}$$

2. How many grams of Fe₃O₄ are produced if 133 grams of iron reacts with 198 grams of water? (Work on back if needed)

$$\frac{133\text{g Fe}}{56\text{g Fe}} \times \frac{1\text{mol Fe}}{3\text{mol Fe}} \times \frac{4\text{mol H}_2\text{O}}{1\text{mol Fe}} \times \frac{18\text{g H}_2\text{O}}{1\text{mol H}_2\text{O}} = 57.0\text{g H}_2\text{O}$$

$$\frac{198\text{g H}_2\text{O}}{18\text{g H}_2\text{O}} \times \frac{1\text{mol H}_2\text{O}}{4\text{mol H}_2\text{O}} \times \frac{3\text{mol Fe}}{1\text{mol H}_2\text{O}} \times \frac{56\text{g Fe}}{1\text{mol Fe}} = 462\text{g Fe}$$

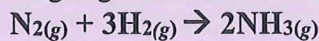
$$\frac{133\text{g Fe}}{56\text{g Fe}} \times \frac{1\text{mol Fe}}{3\text{mol Fe}} \times \frac{1\text{mol Fe}_3\text{O}_4}{1\text{mol Fe}} \times \frac{232\text{g Fe}_3\text{O}_4}{1\text{mol Fe}_3\text{O}_4} = \boxed{184\text{g Fe}_3\text{O}_4}$$

Name Key Hour _____

Quiz 12.3 (V-B)

(Honors Chemistry)

- a.) What is the limiting reagent if 162 grams of nitrogen gas reacts with 12.7 grams of hydrogen gas?



LR: ~~H₂~~ H₂

$$\frac{162\text{g N}_2}{28\text{g N}_2} \times \frac{1\text{mol N}_2}{1\text{mol N}_2} \times \frac{3\text{mol H}_2}{1\text{mol N}_2} \times \frac{2\text{g H}_2}{1\text{mol H}_2} = 34.7\text{g H}_2$$

$$\frac{12.7\text{g H}_2}{2\text{g H}_2} \times \frac{1\text{mol H}_2}{1\text{mol H}_2} \times \frac{1\text{mol N}_2}{3\text{mol H}_2} \times \frac{28\text{g N}_2}{1\text{mol N}_2} = 59.3\text{g N}_2$$

- b.) What is the excess reagent and how much excess is present?

ER: 103g N₂

- c.) Assuming STP, how many liters of ammonia (NH₃) can be produced using the information in 1a?

$$\frac{12.7\text{g H}_2}{2\text{g H}_2} \times \frac{1\text{mol H}_2}{1\text{mol H}_2} \times \frac{2\text{mol NH}_3}{3\text{mol H}_2} \times \frac{22.4\text{L NH}_3}{1\text{mol NH}_3} = 94.8\text{L NH}_3$$

2. How many grams of Fe₃O₄ are produced if 249 grams of iron reacts with 41.4 grams of water? (Work on back if needed)



$$\frac{249\text{g Fe}}{56\text{g Fe}} \times \frac{1\text{mol Fe}}{3\text{mol Fe}} \times \frac{4\text{mol H}_2\text{O}}{1\text{mol Fe}} \times \frac{18\text{g H}_2\text{O}}{1\text{mol H}_2\text{O}} = 107\text{g H}_2\text{O}$$

$$\frac{41.4\text{g H}_2\text{O}}{18\text{g H}_2\text{O}} \times \frac{1\text{mol H}_2\text{O}}{4\text{mol H}_2\text{O}} \times \frac{3\text{mol Fe}}{1\text{mol H}_2\text{O}} \times \frac{56\text{g Fe}}{1\text{mol Fe}} = 96.6\text{g Fe}$$

$$\frac{41.4\text{g H}_2\text{O}}{18\text{g H}_2\text{O}} \times \frac{1\text{mol H}_2\text{O}}{4\text{mol H}_2\text{O}} \times \frac{1\text{mol Fe}_3\text{O}_4}{1\text{mol H}_2\text{O}} \times \frac{232\text{g Fe}_3\text{O}_4}{1\text{mol Fe}_3\text{O}_4} = \boxed{133\text{g Fe}_3\text{O}_4}$$