

Chemistry Lesson: Steemit Edition Problem Set 4

1.) Balance the following chemical reaction: $\text{Fe}_2\text{O}_3 (\text{s}) + \text{Al} (\text{s}) \rightarrow \text{Al}_2\text{O}_3 (\text{s}) + \text{Fe} (\text{s})$

This reaction is the thermite reaction, it was used in the 1800's to weld railroads together before the advent of the modern welding techniques, it is my personal favorite chemical reaction because of how it looks! For reference check out this video of it: (<https://youtu.be/M3ZkoNF2ybg>)



2.) Using the balanced reaction above. We reacted 0.7 mol of Fe_2O_3 with 1 mol of Al, and obtained 41 g of iron (Fe). What is our percent yield from the thermite reaction we performed?

$$0.7 \text{ mol } \text{Fe}_2\text{O}_3 \times \frac{1 \text{ "products" }}{1 \text{ Fe}_2\text{O}_3} = 0.7 \text{ mol products}$$

$$1 \text{ mol Al} \times \frac{1 \text{ "products" }}{2 \text{ Al}} = 0.5 \text{ mol products}$$

Thus aluminum (Al) is our limiting reagent.

$$1 \text{ mol Al} \times \frac{2 \text{ Fe}}{2 \text{ Al}} = 1 \text{ mol Fe} \times \frac{55.8 \text{ g Fe}}{1 \text{ mol Fe}} = 55.8 \text{ g Fe (Theoretical Yield)}$$

$$\% \text{ Yield} = \frac{41 \text{ g}}{55.8 \text{ g}} \times 100\% = 73.4\% \text{ yield}$$