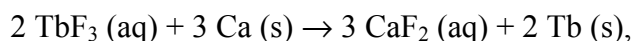


Follow along as you view the video, "Stoichiometry: Theoretical and Percent Yield" on edpuzzle.com and fill in the blanks as you go. (Also available at (<http://youtu.be/g5EMambSfrg>))

Theoretical and Percent Yield

- The **Theoretical Yield** is the _____ expected from the _____.
- To find the theoretical yield, first determine the _____ (which becomes G), then calculate the _____ (W) from the moles of the limiting reactant.
- This is simply a stoichiometry problem to determine the mass of the product from the limiting reactant.
 - Example: Given the reaction,



what is theoretical yield of Tb that can be produced by reacting 27.5 g of TbF_3 with 6.96 g of Ca?

- First determine the _____:

$$27.5 \text{ g TbF}_3 \times \frac{\text{_____}}{\text{_____}} ; 6.96 \text{ g Ca} \times \frac{\text{_____}}{\text{_____}}$$

$$\text{equiv. TbF}_3 = \frac{\text{_____}}{\text{_____}} ; \text{equiv. Ca} = \frac{\text{_____}}{\text{_____}}$$

_____, so _____

- This is now a simple Mole-Mass problem:

Theoretical Yield Tb = 0.173 mol Ca

- Percent Yield

- The **Percent Yield**: $\% \text{ Yield} = \frac{\text{Actual Yield}}{\text{Theoretical Yield}} \times 100$ (in Chart B)

- Actual yield will be either _____
- Why might we not collect all of the expected product in a reaction (% Yield < 100%)?
 -
 -

-
- Can get % Yield > 100% if product is contaminated.

-

-

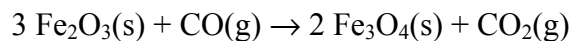
- % Yield Calculation

- First determine the theoretical yield, as above
- Next, divide the actual yield by the theoretical yield and multiply by 100 (equation above)
- Example: In the previous problem (theoretical yield = 18.4 g Tb), what is the percent yield if the *actual yield* is 16.8 g Tb?

$$\% \text{ Yield} = \underline{\hspace{10em}}$$

- Your Turn

- Magnetite, Fe₃O₄ an important magnetic ore with mixed Fe(II) and Fe(III), is prepared as follows:



What are the theoretical and percent yields of Fe₃O₄ if 68.9 g Fe₂O₃ reacts with 5.00 g CO to yield 59.2 g Fe₃O₄?

- First find the limiting reactant:

- Next find the theoretical yield:

- Finally find the % Yield:

- Read §12.4, pp. 370-373 in text