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This is the amount of reactant that will allow us to determine TY of water when we’ve used it all up!

AY of experiment

**Bellwork:**

In a combustion experiment, a student makes 4.7 L of H2O (g) when burning 3.6 L ethane gas, C2H4 (g), in the presence of oxygen. What is the percent yield of this reaction? What is the percent error? C2H4 + 3O2 🡪 2CO2 + 2H2O

a. Calculate theoretical yield of H2O

$$3.6 L C\_{2}H\_{4}×\frac{1 mol C\_{2}H\_{4}}{22.4 L C\_{2}H\_{4}}×\frac{ 2 mol H\_{2}O}{1 mol C\_{2}H\_{4}}×\frac{22.4 L H\_{2}O}{1 mol H\_{2}O}=7.2 L H\_{2}O$$

b. Determine percent yield of reaction

 $Percent yield= \frac{actual yield}{theoretical yield}×100\%=\frac{4.7 L H\_{2}O}{7.2 L H\_{2}O}×100\%=65\%$

c. Determine percent error of reaction

$$Percent yield= \frac{\left|TY-AY\right|}{TY}×100\%=\frac{7.2-4.7 L H\_{2}O}{7.2 L H\_{2}O}×100\%=35\%$$

***Save the World* data analysis:**

 Fill in the table below with the results your group obtained from lab. We will calculate the percent yield and percent error for Groups A and B as a class.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Group | Given reactant | Theoretical yield of antidote (g) | Actual yield (g) | Percent Yield | Percent Error |
| A | LiHCO3 | 2.00 g LiCl | 1.68 g LiCl |  |  |
| B | LiHCO3 | 2.00 g LiCl  | 2.14 g LiCl |  |  |
| Yours! |  |  |  |  |  |

***Save the World* error analysis:**

Look back over the data in the table above. Are the sources of error the same for Groups A and B? What would lead to having too much or too little of the expected product?

Draw arrows in front of the reactants and products to show sources of error:

Group A: LiHCO3  + HCl $\rightarrow $ LiCl + H2O + CO2

*What errors could have occurred such that they brought less product to the scale than they expected to?*

Group B: LiHCO3  + HCl $\rightarrow $ LiCl + H2O + CO2

*What errors could have occurred such that they brought more material to the scale than they intended to?*

**Construct a Claim-Evidence-Reasoning argument to show that you recognize the source of error and can modify your experimental procedure in the future to obtain better results:**

Your group’s reaction:

**Claim:** Our group’s experiment produced too \_\_\_\_\_\_\_\_ of the antidote in comparison with what was expected. This led to a percent error of \_\_\_\_\_\_\_\_\_\_\_\_\_.

**Evidence:** During our lab, the reaction didn’t go as planned when...

**Reasoning:** This error caused our actual yield to be too \_\_\_\_\_\_\_\_, because….

Analyze and evaluate an error analysis for the Empirical Formula Lab:

*(1) Read through the following error analysis section from this student’s Empirical Formula lab.*

*(2) Identify their claim, their use of evidence and their lines of reasoning by underlining or highlighting these elements.*

*(3) Write 2-3 sentences about how effective you feel that they analyzed their lab process and suggestions for improvement.*

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