



High School Science Virtual Learning

Chemistry

Limiting Reactants

April 23, 2020



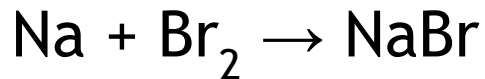
High School Chemistry

Lesson: April 23, 2020

Objective/Learning Target:

Students will be able to determine limiting reactants and calculate a theoretical yield given amounts of two reactants.

Let's Get Started:



1. Balance and classify the reaction above.
2. If 13 grams of Br_2 are consumed in the reaction, how many moles of NaBr are produced?

Let's Get Started: Answer Key

1. Balance and classify the reaction above.



2. If 13 grams of Br_2 are consumed in the reaction, how many moles of NaBr are produced? **17 g NaBr**

13 g Br_2	1 mol Br_2	2 mol NaBr	102.894 g NaBr = 17 g NaBr
1	159.808 g Br_2	1 mol Br_2	1 mol NaBr



Lesson Activity:

Directions:

1. Watch this [video](#) over limiting reactants with a review of percent yield.



Practice

Complete the following questions using the information you learned during the lesson activity.

Questions: $2\text{NaOH} + \text{MgCl}_2 \rightarrow \text{Mg}(\text{OH})_2 + 2\text{NaCl}$

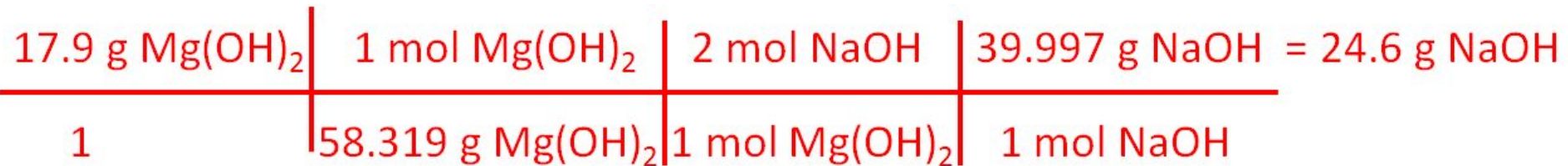
1. 36.5 grams of NaOH reacts with 29.2 grams of MgCl_2 . What mass of $\text{Mg}(\text{OH})_2$ can be produced?
2. What is the limiting reactant? What is the excess reactant?
3. How much of the excess reactant will be leftover?

Once you have completed the practice questions check with the **answer** key.

36.5 g NaOH	1 mol NaOH	1 mol Mg(OH) ₂	58.319 g Mg(OH) ₂ = 26.6 g Mg(OH) ₂
1	39.997 g NaOH	2 mol NaOH	1 mol Mg(OH) ₂
29.2 g MgCl ₂	1 mol MgCl ₂	1 mol Mg(OH) ₂	58.319 g Mg(OH) ₂ = 17.9 g Mg(OH) ₂
1	95.211 g MgCl ₂	1 mol MgCl ₂	1 mol Mg(OH) ₂

1. The answers on the previous slide mean that there is enough NaOH to produce 26.6 grams, but only enough MgCl_2 to produce 17.9 g. There only **17.9 grams of Mg(OH)_2** can be produced. Always pick the smaller number.
2. **MgCl_2 is the limiting reactant** because it made a smaller amount of product. **NaOH was the excess reactant** because it would have been able to make more product.

- Using the amount of $\text{Mg}(\text{OH})_2$ produced, you can calculate how much NaOH was used. This comes out to be 24.6 grams, based on the train below. Subtracting this from the initial amount (36.5 grams), gives us the leftover amount, **11.9 g**.





More Practice:

Follow the links below to do more practice.

1. This [simulation](#) is to help you understand the concepts behind the math.
2. This [web page](#) will check your answers as you go.



Additional Practice:

Click on this [link](#) for additional practice. The answer key is found at the bottom.