

# Limiting reactant effect on lab



**ASSIGN  
BUSTER**

## The Limiting Reactant Lab

### ABSTRACT

The purpose of this lab is to see how the limiting reactant affects the whole lab. To determine what the other limiting reactant was and how much of reactant was there.

### INTRODUCTION

A limiting reactant limits the reaction and controls the amount of product formed when balancing an equation and making calculations. When calculating a limiting reactant, two reactant masses are given because once the limiting reactant is gone the reaction stops producing. Limiting reactant is the reactant that is completely used until there isn't any more of it and then the reaction will stop. (Shah, 2007) (Buthelezi, Dingrando, Hainen, Winstrom, & Zike, 2013). Hypothesis is proposed that if there is a sufficient amount of iron that the copper would not be precipitated.

### MATERIALS

- Ring Stand
- Filter Paper
- Distilled Water
- Stirring Rod
- Pipet stem triangle
- Balance
- Copper(II) sulfate
- 100mL beaker

- Wire screen
- Weigh cups
- Iron filings
- 250mL beakers
- Bunsen burner

## METHODS

The mass of 100mL beaker was measured using a balance. The mass of the weigh cups were taken using a balance, also. 8 grams of copper sulfate crystals were measured using a balance and placed into the 100mL beaker. A graduated cylinder was used to measure out 50 mL of water out to add into the crystals. A Bunsen burner was lit under the ring stand with the wire screen on the ring clamp holding the 100mL beaker and substances in place. The beaker was heated and stirred until just before it began to boil, then the gas was shut off to stop the flame[CS5] and the solution began to cool. 1. 3 grams of iron filings were stirred into the hot copper sulfate crystals. The 100mL beaker was left to cool for ten minutes while observing the reaction taking place. A sheet of filter paper was taken including initials written[CS6] on it and weighed. A filtration system was made and placed into a funnel. The funnel was placed over an E[CS7]. flask. The liquid was poured slowly into the funnel going through the [CS8] filter paper and into the flask. With tap water the beaker was rinsed. When the solid settled [CS9], the beaker was rinsed two more times, until all of the solid was transferred to the filter paper. The filter paper was placed onto a watch glass and then placed into the oven. Once it is cooled [CS10], the mass of the beaker, filter paper and solid were recorded.

## RESULTS

The Limiting Reactants limit the reaction. Once the limiting reactant is gone the reaction stops, it determines the amount of the product being produced. Single replacement reaction is a chemical reaction happens when certain atoms in one replace the atoms in another element. If you don't balance and record your numbers then you cannot keep track of how much you have, and then it can make you to use too much or too less of needed for the chemical reaction. Using dirty glassware can affect the weights and the reaction occurring.

Mass of  
empty 100mL  
beaker 70g

Mass of  
copper (II) sulfate 8.0g

Mass of  
iron filings 3g

Substance

ce

collected 0g

d

Mass of

2.

filter

0g

paper

Moles of copper (II) sulfate equaled out to be 0.08 moles because 8.0 grams of copper sulfate multiplied by one mole of copper sulfate divided by 96g of copper sulfate equaled 0.08 moles. The amount of iron added to the solution calculated out to be 0.02 mol Fe because 1.3 multiplied by one mole Fe divided by 56 grams Fe equals 0.02 mol Fe. There were 0.05 moles of substance produced due to 3 grams being multiplied by 1 and divided by 64 grams and equals to 0.05 moles of substance. Moles of iron metal reactant came out to be 2.8 moles because 8 grams multiplied 1 mole divided by 160 grams multiplied by 56 grams equals 2.8 moles. Copper (II) sulfate starts with 3 grams divided by 56 grams multiplied by 160 grams equals 8.57 moles  $\text{CuSO}_4$ . The limiting reactant is the iron metal. It's the lowest number. The  $\text{CuSO}_4$  was the excess due to having more left over an exact amount of 8.57 moles. The only error that occurred in the lab would be the beaker not being quite as clean as needed in correct recording of the iron filings. Also that some of the iron was still built up along the sides of the beaker. Some of the iron came out before it reached the beaker with the copper (II) sulfate.

[CS1]APA format says that the running head should be left aligned and page number right aligned. The title of your lab should also be in all caps.

[CS2]Please do not use &. Either use a comma or the word and.

[CS3]Your abstract is missing. Please create a new page, make a center and bold heading Abstract, and complete. Your abstract should be a summary of the purpose of the lab and your findings.

[CS4]Paragraphs should be indented.

[CS5]Shutting the gas off stopped the flame. Please be specific and explain that instead.

[CS6]Third person

[CS7]Spell out the name.

[CS8]And would work here also

[CS9]comma

[CS10]comma

[CS11]The first line of the paragraph is indented only.

[CS12]comma

[CS13]Please clarify.

[CS14]Just so this lab report will flow a little better, please put a sentence here about potential errors could have been caused by these things in the sentences that follow.

[CS15]Please don't use contractions.

[CS16]Third person, please. Try something like it would be possible to ....

[CS17]This should be spelled ware.

[CS18]masses

[CS19]If you say this, you need to explain how. Dirty glassware causes masses to be falsely increased due to contaminants or side reactions that use up the reactants to make an undesired product.

[CS20]Put in a heading to label this table as Table 1. It should be bold and left aligned.

[CS21]Please left align

[CS22]This needs subscript.

[CS23]This is very difficult to read. Please see me for correct format. Also, instead of going by the calculations listed in the form, calculate limiting reactant and excess in grams the way we did in class.

[CS24]Instead of this, it needs to be specific. The limiting reactant was iron metal since calculations indicated that the smallest amount of copper could be produced.

[CS25]Many errors are possible. Please mention incorrect measurements, faulty balances, side reactions due to dirty glassware.

[CS26]Incorrect is one word

[CS27]This does not need to be capitalized.

[CS28]comma

[CS29]Do not capitalize

[CS30]Remained in the beaker

[CS31]Came out? How did it come out? Be specific. Mention sticking to the weigh boat, spilling, or some other means of losing the iron.