

3. In order to find the **moles of copper solid produced**, you will need to divide the mass of the copper produced by its molar mass.
- Record the molar mass of copper _____ g/mole.
 - Consider the mass of copper solid produced in the reaction:
_____ grams
 - Calculate the moles of copper produced in the reaction: _____ moles

 - Using Avogadro's number calculate how many $\text{Cu}_{(s)}$ atoms were produced?
_____ atoms
4. Compare the initial moles of Cu^{2+} to the number of moles of $\text{Cu}_{(s)}$ produced by calculating the percent yield after 2 hours:
- Moles of $\text{Cu}_{(s)}$ produced in the reaction: _____ moles
 - Moles of Cu^{+2} used initially: _____ moles
 - Percent yield = (moles produced) / (moles available initially) $\times 100\%$ =

 - Make a hypothesis of what would happen if the reaction were allowed to proceed for 5 hours instead of only 2 hours. Would more copper solid be produced? _____
Why or Why not?

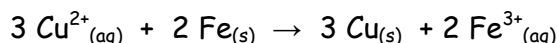
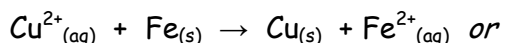
5. In order to find the **moles of iron consumed**, you will need to divide the mass of the iron used by the molar mass.

- Record the molar mass of iron: _____ g/mole.
- Consider the mass of iron consumed in the reaction: _____ grams
- Then calculate the moles of iron consumed in the reaction: _____ moles

d. Using Avogadro's number calculate how many $\text{Fe}_{(s)}$ atoms were consumed in the reaction: _____ atoms

e. If one nail weighs 2.76 grams, how many nails would represent one mole of iron?
_____ nails

6. **Which iron ion is produced, Fe^{2+} or Fe^{3+} ?** Your lab manual has a section titled "Understanding the Reaction" which discusses the fact that we could produce either $\text{Fe}^{2+}_{(aq)}$ or $\text{Fe}^{3+}_{(aq)}$ ions. Below are the possible reactions:



- Reexamine your calculations in questions 3c and 5c and use those answers to determine the ratio of moles of copper solid produced (_____ moles) to moles of iron solid consumed (_____ moles). _____ moles Cu/ moles Fe.
- Does your data agree with the stoichiometry shown in one of the overall chemical reactions you balanced earlier? Which one? Is Fe^{2+} or Fe^{3+} formed? _____

c. Calculate the % error in your molar ratio:

$$\% \text{ error} = [(\text{experimental ratio}) - (\text{expected ratio})] / (\text{expected ratio})$$

$$\% \text{ error} = \underline{\hspace{2cm}}$$

7. List at least two some sources of error in this experiment (i.e. reasons why your percent yield is not 100% and your percent error is not 0%). Do not include human error (e.g. "I might have made a mistake.").

III. Workshop take-home question:

8. A Nobel-Prize-worthy compound...

a. Consider 100g of the substance. What is the mass of each element, in grams, in that 100g sample?

C _____

H _____

Fe _____

b. How many moles of C, H, and Fe are there in this arbitrary 100g sample? Show work.

C _____

H _____

Fe _____

c. What is the chemical formula of the Nobel-Prize-worth compound?
