

**AP Chemistry Lab**  
**Composition of Brass**

**Prelab Questions**

- 1) What is an alloy?
- 2) Brass is an alloy. What two metals are used to make Brass?
- 3) What is the percentage of copper in brass?
- 4) What is the difference between an interstitial alloy and a substitutional alloy?
- 5) There will be two metal ions in the solution that you prepare. Which one gives it its color?
- 6) Why isn't the second ion colored? What is special about it?
- 7) Write the equation for the reaction of copper metal with concentrated nitric acid.
- 8) Write the equation for the reaction of Zinc metal with nitric acid.
- 9) What is the molarity of concentrated nitric acid solution?
- 10) The following data was collected for a solution of copper (II) ion. Prepare a Beer's Law plot for the data. This should be computer generated and take the whole page in landscape format. Make sure to bring a copy to lab on standard copy paper.

Concentration (Molarity)	Absorbance
0.40	0.80
0.20	0.40
0.10	0.20
0.050	0.10

**Procedure**

- 1) Follow all appropriate safety procedures.
- 2) Find the mass of a sample of brass. You will need around 1g.
- 3) Put the brass in a labeled 25 mL beaker and in the fume hood have your instructor add about 5 mL of concentrated nitric acid to the beaker and heat it until the brass is dissolved.
- 4) Add a small (25 mL) sample of distilled water to the beaker, mix, and transfer to a clean 100 mL Volumetric flask. Make sure you rinse any copper(II) left in the beaker into the flask with distilled water. Fill the flask to the mark with distilled water.
- 5) Mix the contents of the flask well.
- 6) Set your spectrophotometer to 630 nm.
- 7) Wash a cuvette with soap and water and rinse with distilled water. Only handle it with a Kimwipe from this point forward. Fingerprints and dirt are your enemy.
- 8) Prepare a blank cuvette containing distilled water and calibrate a spectrophotometer for 0% and 100% absorbance.
- 9) Rinse a clean cuvette with some of your solution to remove any water that might be in there. Do this twice.
- 10) Fill a cuvette three quarters full with your solution. Measure the absorbance of your copper (II) sample.

11) Dispose of the copper solution according to the instructions of your teacher.

12) Clean up and make sure you wash your hands before leaving the lab.

### Data Table

Mass of Brass Sample	
Volume of the solution	
Sample Absorbance	

### Post Lab Questions

- 1) What is the concentration of copper ions in the solution measured in Molarity?
- 2) What is the mass of the copper ions in the 100 mL's of solution?
- 3) What is the mass percentage of copper in your brass sample?
- 4) What is the mass percentage of Zinc?
- 5) If the reaction with nitric acid only converted the copper metal to the copper (I) ion would this same procedure work?
- 6) If some of the copper (II) solution was left in the beaker and not transferred to the volumetric flask what would happen to the percentage of copper in the brass?
- 7) If the solution in the volumetric flask was not well mixed what would happen to the percentage of copper in the brass?
- 8) What would happen to the percentage of copper in brass if you failed to rinse the cuvette with the copper(II) solution?
- 9) Name one thing (not previously discussed) that would cause your percentage to be low.
- 10) Name one thing (not previously discussed) that would cause your percentage to be high.