

CHEM 201
Laboratory of General Chemistry (2)
Laboratory Reports

Razan AlOtaibi & Hind AlRushud
Emtinan AlZhrani

1442 H

Report No. (1):
Percent Composition of Zinc and Copper in coins.

Student Names: Section No:.....

Objectives:

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Results and calculation:

1. You will now create a excel table for of the metals might look like this:

objects	mass (g)	Volume _{before} (mL)	Volume _{after} (mL)	Volume _{object} (mL)	d (g/mL)
				Average	
				% Error	
				% Precision	

2. Create a table that correlates the density of a Cu/Zn composite (coins) to the percent Cu present.

p % Cu	Density of Cu/Zn composite(g/mL)
0	
10	
20	
50	
70	
100	

3. Plot a graph that correlates the density of a Cu/Zn composite (coins) to the percent Cu present.

What does this tell you about the relative monetary value of Cu and Zn?

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Report No. (2):
Atomic Emission spectra -Flame Tests Experiment

Student Names: Section No:.....

Objectives:

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Results and calculation:

Colour of light absorbed	Approx. λ ranges / nm	Colour of light transmitted
Red	700-620	Green
Orange	620-580	Blue
Yellow	580-560	Violet
Green	560-490	Red
Blue	490-430	Orange
Violet	430-380	Yellow

Unknown number: (....)

1. Color of light transmitted:
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2. Color of light absorbed:
.....
3. Metal atom:
.....
4. Wavelength range:
.....
5. The energy of the wavelength:
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6. The energy of the wavelength:
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Unknown number: (....)

1. Color of light transmitted:
.....
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.....
3. Metal atom:
.....
4. Wavelength range:
.....
5. The energy of the wavelength:
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6. The energy of the wavelength:
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**Report No. (3):
Measuring the pH of a Solution**

Student Names: Section No:.....

Objectives:

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Results and calculation:

Part One: Using HCl Solution.

- Balance Equation:

V_{NaOH}	PH
0	
5	
10	
15	
20	
22	
23	
24	
26	
27	
30	
35	
40	

- Draw a curve between pH values and the volume added from NaOH and then from the curve determine :
 - ✓ The volume of NaOH at equivalent point
 - ✓ pH value at equivalent point

- Calculations:

- Molarity of HCl

- Normality

- Molecular weight of HCl

- Strength of solution.

Part two: Using CH₃COOH Solution.

- Balance Equation:

V _{NaOH}	PH
0	
5	
10	
20	
25	
28	
29	
30	
31	
32	
35	
40	
45	

- Draw a curve between pH values and the volume added from NaOH and then from the curve determine:
 - ✓ The volume of NaOH at equivalent point
 - ✓ pH value at equivalent point

C) Draw the following molecules using MOLVIEW website (<https://molview.org/>) and investigate their shapes and properties like bond angle, bond length and compare the results by which you are expected above.

a. CH₄

b. H₂O

c. NH₃

d. SF₆

e. SO₃

f. SO₃²⁻

D) Arrange the molecules (a ,b, c) in the increasing order of bond angle and discuss the reason behind this order.

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Report No. (5):
Chemical equilibrium – (part 1)
Ionic equilibrium in solution.

Student Names: Section No:.....

Objectives:

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Balance Equation:

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Results and calculation:

Part A: Concentration Changes

- **Table (1):** Equilibrium shift on increasing the concentration:

Boiling tube	Substance added at equilibrium	Change in the color intensity as matched with the reference solution in boiling tube "a"	Effect on the concentration of $[\text{Fe}(\text{SCN})(\text{H}_2\text{O})_5]^{2+}$	Direction of shift in equilibrium
A	5 ml of water			
B	5 ml of 0.1M FeCl_3 solution			
C	5 ml of 0.1M KSCN solution			
D	5 ml of 0.1M KCl solution			

Part B: Changes in Temperature

- **Table (2):** The effect of temperature changes (hot and cold) on the aqueous equilibrium after placing the test tubes in hot water and ice water

Boiling tubes	Water temperature	Change in the color intensity as matched with the reference solution in boiling tube "a"	Direction of shift in equilibrium
1			
2			
3			

What is Le Chatelier's principle?

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What are the factors affecting the Position of Equilibrium?

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Report No. (6):
Chemical equilibrium – (part 2)
Determination of the equilibrium constant for formation of important ethyl ethanoate

Student Names: Section No:.....

Objectives:

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Balance Equation:

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Results and calculation:

V _{initial} (ml)	V _{final} (ml)	V (ml)	V _{Average} (ml)

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Let the $[CH_3COOH]$ at equilibrium that is determined from the titration be x M.

	CH ₃ CH ₂ OH _(aq)	CH ₃ COOH _(aq)	CH ₃ COOCH ₂ CH ₃ _(aq) + H ₂ O _(l)
Initial conc. (M)			
At equilibrium(M)			

K_c =.....

Report No. (7):
Kinetic study of Sodium Thiosulfate reaction with Hydrochloric Acid

Student Names: Section No:.....

Objectives:

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Balance Equation:

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Results and calculation:

The first case is when the chloric acid concentration is constant and the sodium thiosulfate concentration changes

No.of exp	V(Na ₂ S ₂ O ₃)	V(H ₂ O)	V(HCl)	V	V ²	T (sec)	1/t
1	25	0	4				
2	20	5	4				
3	15	10	4				
4	10	15	4				
5	5	20	4				

- Plot the relationship between V and (1 / t) with k' illustrated.
- The law is.....

The second case: when the chlorine acid concentration changes and the sodium thiosulfate concentration remains constant

No.of exp	V(Na ₂ S ₂ O ₃)	V(H ₂ O)	V(HCl)	V	V ²	T (sec)	1/t
1	10	0	5				
2	10	1	4				
3	10	2	3				
4	10	3	2				
5	10	4	1				

- Plot the relationship between V and (1 / t) .
- The law is.....

Report No. (8):
Oxidation-reduction reactions (Redox reactions).

Student Names: Section No:.....

Objectives:

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Results and calculation:

Part one: Potential Series for metals

1. Reactions of Hydrogen with Copper, and Zinc

Colors of Halogen	Observations	Net ionic equation
Copper + hydrochloric acid		
Zinc + hydrochloric acid		

2. Reactions of Copper, silver, and Zinc

Colors of Halogen	Observations	Net ionic equation
Copper + zinc sulfate		
Zinc + copper sulfate		

Q1: Relative oxidizing strengths, which is the stronger oxidizing agent Cu^{2+} or Zn^{2+} ?

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Colors of Halogen	Observations	Net ionic equation
Copper + silver nitrate		

Q2: Arrange Cu^{2+} , Zn^{2+} , Ag^+ , and H^+ in the decreasing order of reactivity.

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Part two: Potential Series for Halogens

<i>part</i>	Colors of Halogen	Color in Cyclohexane	Observations	Net ionic equation
<i>a</i>				
<i>b</i>				
<i>c</i>				
<i>d</i>				

What is the correct order of oxidizing strength of (Cl₂, I₂)?

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You don't test (F₂) in this experiment, but according to the order you observed for the other halogens, expect the oxidizing strength of F₂ and explain your answer?

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