Chem 100
Online Lab

Exam 2

Name:
Please put away your cell phones. Use the restroom before exams.
Please provide answers to the Online Quizzes on Latenite labs on Experiments. The Quiz grades will be part of your Exam grade.

Q1. (15 points)
List the main 4 factors that affect solubility
1
2
3
4

Which of the following ionic solids would have a higher solubility? Provide reasons (2 sentences)
KBr vs Al₂S₃

Which of the following ionic solids would have a higher solubility? Provide reasons (2 sentences) What ratio should be small for increased solubility?
RbBr vs MgO

Which of these solvents would be best for dissolving the ionic solids used in your experiment?
H₂O, CH₃OH, CH₃OCH₃, CCl₄
_________ > _________ > _________ > _________
Q2: (10 points) Here is the official solubility data for an unknown solid in grams/10 mL H2O:

At 30 °C: 3.71g / 10 mL H2O
At 50 °C: 4.29g / 10 mL H2O
At 70 °C: 4.85g / 10 mL H2O
At 90 °C: 5.38g / 10 mL H2O

What is the solubility of the unknown solid at 80 °C in g/100 mL?

Show calculations and work
Q3. (15 points)
a. What is the difference between elements and compounds? (1 sentence)

What is the difference between solutions and compounds? 1 sentence)

What is the difference between empirical formula and molecular formula? (1 sentence)

b. Find the Empirical formula for compound formed between Magnesium and Oxygen using the data below

<table>
<thead>
<tr>
<th>a</th>
<th>The Mass of the Crucible (g)</th>
<th>26.05</th>
</tr>
</thead>
<tbody>
<tr>
<td>b</td>
<td>The initial mass of Magnesium powder and the crucible (g)</td>
<td>26.14</td>
</tr>
<tr>
<td></td>
<td>The mass of Magnesium in powder (g)</td>
<td>?</td>
</tr>
<tr>
<td></td>
<td>The moles of Magnesium in powder (mols)</td>
<td>?</td>
</tr>
<tr>
<td></td>
<td>The final mass of Magnesium oxide and the crucible after the reaction (g)</td>
<td>26.20</td>
</tr>
<tr>
<td></td>
<td>The gain in mass of the added mass of oxygen (g)</td>
<td>?</td>
</tr>
<tr>
<td></td>
<td>The gain in moles of the added oxygen (mols)</td>
<td>?</td>
</tr>
</tbody>
</table>

What is the Empirical formula of the Magnesium Oxide formed? Show calculations.

c. Write a balanced equation for your reaction:
Q4. (15 points) Complete the reaction between Silver nitrate and Copper used in your
experiment and balance them using the correct co-efficients.

\[ \_\_\_ \text{AgNO}_3 \text{(aq)} + \_\_\_ \text{Cu} \rightarrow \_\_\_ \text{AgCl}(s) + \_\_\_ \text{Ba(NO}_3)\text{aq)} \]

Provide the experimental method that was used to find the stoichiometric coefficients of the balanced equation.

A student reacted 10.2 g of barium chloride with silver nitrate, according to the equation

\[ m \text{BaCl}_2\text{(aq)} + n \text{AgNO}_3\text{(aq)} \rightarrow x \text{AgCl}(s) + y \text{Ba(NO}_3)\text{aq)} \]

She isolated 14.5 g of silver chloride.

<table>
<thead>
<tr>
<th>Mass of Barium chloride used (g)</th>
<th>10.2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Moles of Barium chloride used (mol)</td>
<td>?</td>
</tr>
<tr>
<td>Mass of Silver chloride produced by the reaction (g)</td>
<td>14.5</td>
</tr>
<tr>
<td>Moles of Silver chloride produced by the reaction (mol)</td>
<td>?</td>
</tr>
</tbody>
</table>

What was her experimental molar ratio of AgCl to BaCl\text{aq}_2\text{?}

Show all work

Write the balanced reaction

Best Wishes!

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