Student Postlab

Separation of a Mixture Lab

Chemistry

Data Table B: Separation of iron filings, sand, and metal pieces

Iron Filings	
Mass of empty petri dish (g)	
Mass of petri dish and iron filings (g)	
Mass of iron filings original (g)	(mass dish + iron) - (mass of empty dish)
Mass of petri dish + recovered iron filings (g)	
Mass recovered iron filings (g)	(mass dish + recovered iron) - (mass of empty dish)
Observation of iron before	**Observation** of iron after
Metal Pieces	
Mass of empty sample cup (g)	
Mass of sample cup and metal pieces (g)	
Mass of metal pieces (g)	(mass metal pieces + cup) - (mass empty cup)
Mass sample cup + recovered metal pieces (g)	
Mass of recovered metal	(mass recovered metal pieces + cup) - (mass empty cup)

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balls (g)	
Observation of metal pieces before	**Observation** of metal pieces after
Sand	
Mass of empty weighing boat (g)	
Mass of weighing boat + sand (g)	
Mass of sand original (g)	(mass sand + boat) - (mass empty boat)
Mass of weighing boat + recovered sand (g)	
Mass recovered sand (g)	(mass recovered sand + boat) - (mass empty boat)
Observation of sand before	**Observation** of sand after
Total Mixture	
Mass of Total Mixture (g)	mass iron + mass sand + mass metal pieces
Mass of total mixture recovered (g)	mass recovered iron + mass recovered sand + mass recovered metal

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Observation of Mixture	

Data Table C: Separation of Salt and Water

Mass of empty beaker (g)	
Mass of salt original (g)	
Mass of water original (g)	
Observation of Salt-water	
Total Mass of salt-water mixture (g)	mass salt + mass water
Total mass of salt-water mixture recovered (g)	mass recovered salt + mass water evaporated
Mass of empty evaporating dish (g)	
Mass of evaporating dish + salt-water	
Observation of recovered salt	

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Mass of recovered salt + evaporating dish (g)	
Mass of recovered salt (g)	(mass recovered salt + evaporating dish) - (empty evaporating dish)
Observation of evaporated water	
Mass recovered water that evaporated (g)	(mass evaporating dish + salt-water) - (mass evaporating dish + recovered salt)

Calculations: You must show your work and include appropriate units in order to receive **FULL** credit.

mass of iron filings original = 10.4 g - 8.0 g = 2.4 g iron original

mass of recovered iron = 9.9 g - 8.0 g = 1.9 g iron recovered

Mass difference: Use the following equation to determine the mass of salt, sand, metal, and iron recovered in each separation technique.

Mass sample = (mass sample + container) - (mass empty container)

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Percent Composition: Use the following equation to determine the percent by mass of salt, metal, sand, and iron in each mixture.

Percent by mass = (mass of component / total mass mixture) x 100

Percent Yield: Use the following equation to determine the percent yield of salt, sand, and iron recovered in each separation technique.

Percent yield = (recovered mass / original mass) x 100

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Table of **Results**

Component	**Percent** by mass (original)	**Percent** by mass (recovered)	**Percent** Yield (%)
Sand	$\frac{\text{mass sand}}{\text{mass mixture}} \times 100$	$\frac{\text{mass recov. sand}}{\text{mass recov. mixture}} \times 100$	$\frac{\text{mass sand recovered}}{\text{mass sand original}} \times 100$
Salt	$\frac{\text{mass salt}}{\text{mass mixture}} \times 100$	$\frac{\text{mass recov. salt}}{\text{mass recov. mixture}} \times 100$	$\frac{\text{mass salt recovered}}{\text{mass salt original}} \times 100$
Water	$\frac{\text{mass water}}{\text{mass mixture}} \times 100$	$\frac{\text{mass recov. water}}{\text{mass recov. mixture}} \times 100$	$\frac{\text{mass water evaporated}}{\text{mass water original}} \times 100$
Iron	$\frac{\text{mass iron}}{\text{mass mixture}} \times 100$	$\frac{\text{mass recov. iron}}{\text{mass recov. mixture}} \times 100$	$\frac{\text{mass iron recovered}}{\text{mass iron original}} \times 100$
Metal	$\frac{\text{mass metal}}{\text{mass mixture}} \times 100$	$\frac{\text{mass recov. metal}}{\text{mass recov. mixture}} \times 100$	$\frac{\text{mass metal recovered}}{\text{mass metal original}} \times 100$

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Post-lab Questions: On a Separate Piece of Paper. Answer the following questions in complete sentences, using the data from the lab to support your answer

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1. The chemical formulas for iron, sand, and salt are Fe, SiO_2, and NaCl, respectively. Are these substances elements or compounds? Explain.
   Sand and salt are compounds because…….. Iron is an element because……

2. Are any of the substances magnetic? If so, which ones. Is magnetism a physical or chemical property? Explain

   The only substance that is magnetic is the iron filings. When the magnet was passed over the iron sample……. When the magnet was passed over the other solids…… Magnetism is a …….. because….

3. Which substances dissolved in water? Is solubility a physical or chemical property? Explain.
   Only one of the substances, salt, dissolved in water. When the water was added to the salt…… When water was added to the iron…….. When water was added to the sand…… . Solubility is a……..because…….

4. Is the combination of salt, metal balls and sand a new compound or a mixture? Explain.
   When the salt, water, sand, iron, and metal pieces are mixed, …….. The solids retain their …… This suggests that……

5. Describe the results of the filtration experiment. Which substance remained on the filter paper after filtration. Is the filtrate (the liquid that passed through the funnel) a pure substance? Explain.
   The filtration experiment would have involved separating sand and water. The sand would remain on the filter paper and the salt water would pass through the filter. The filtrate is a mixture of salt and water, it is not a new substance.

6. Did both mixtures have the same percent by mass sand in each sample? Why or Why not? Explain.
   We only measured one sand sample and therefore we cannot compare the percent by mass sand.

7. Compare your percent yield values? In which separation process did you get a greater percent yield of sand? Explain your results.
   In comparing the percent yield values for the sand, salt, water, metal pieces, and iron filings, the metal pieces had the greatest percent yield. The reason for this is…..

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8. Is it expected that you should get 100% yield for all substances? Why or why not?
   No, the only substance that we expect to get 100% yield for is the metal pieces because……

9. Compare your percent by mass in the original to the percent by mass recovered.
   a. Are these values the same?

   No these values are not the same for the sand, salt, water, and iron. However, these values are the same for the metal pieces.

   b. Is it expected that you would get the same percentage for both?

   No, it is not expected that we would get the same percentages for both because we …… This means that ……..

   c. If you didn't get 100% of your recovered material, does it mean that the law of conservation has been violated? Explain.
      No, the law of conservation could NEVER be violated!! This means that……..

10. What are some errors associated with this experiment and how do those errors affect your results?

    Some errors associated with this experiment are……..

11. What are some experimental changes that you could make to this lab to improve your result? How does those improvements affect your accuracy and precision of results

    The experimental changes that could be made to improve results are as follows: