Water of Hydration

Lab Report 6

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Name

1:00

Time

M T (W) R F

PART A. Hygroscopicity, Deliquescence, and Efflorescence

	Mass (sample + glass)		Observations		Classification
	Initial	Final	Initial	Final	Hygroscopic, Deliquescent, Efflorescent, or None
$Na_2CO_3 \cdot 10H_2O$	31.209	31.186	white crystal	white powder	Efflorescent
$KAl(SO_4)_2 \cdot 12H_2O$	52.880	52.884	white powder	white crystal	hygroscopic
$CaCl_2$	31.782	32.320	white crystal	clear gooey liquid	Deliquescent
$CoCl_2 \cdot 6H_2O$	89.362	89.360	pink powder	pink crystal	Deliquescent

PART B. Percentage of Water in a Hydrate

1	Mass of crucible and cover	31.075
2	Mass of crucible, cover, and solid hydrate	32.105
3	Mass of crucible, cover, and residue	31.953
4	Mass of solid hydrate	1.03
5	Mass of residue	0.878
6	Mass of water lost	0.152
	Percentage of water in the unknown hydrate	14.76 %
	Unknown number and molar mass of anhydrous salt (from label)	208.22
7	Number of grams of water per 100 g hydrate	1476
	Number of moles of water per 100 g hydrate	82
8	Number of grams of anhydrous salt per 100 g hydrate	0.39
	Number of moles of anhydrous salt per 100 g hydrate	0.0018
	Formula of hydrate, $X \cdot n\ H_2O$, where X is the anhydrous salt and n is an integer or a half-integer. Round off to the nearest half-integer. For example, a result of 2.4 would be rounded to 2.5, or 5/2.	$X \cdot nH_2O$

Show your calculations for part B on the next page. Attach additional pages if necessary.

PART C. Reversibility of Hydration

Summarize your observations on $CuSO_4 \cdot 5H_2O$:

Initial Color	After Heating	In Solution	After Heating to Dryness	After Final Cooling
Blue Powder	white with very little blue pigment	Blue liquid	white and blue	light blueish Powder

Is the dehydration and hydration of $CuSO_4$ reversible? Yes

PART D. Identification of Hydrates

	H_2O Appears?	Color of Residue	Water Soluble?	Hydrate?
nickel(II) chloride	Yes	light green yellow	residue is Partial soluble at rt but soluble when heated.	Yes green
potassium chloride	No	white white	r.t → not soluble after heating almost is	Yes liquid
calcium carbonate	No	white Grayish	Insolvable at both	ehh little
barium chloride	Yes	white white	r.t → not very soluble after → Yes almost all	Yes liquid

Calculations

32.105 − 31.075 = 1.03 ← mass of solid hydrate

31.953 − 31.075 = 0.878 ← mass of residue

1.03 − 0.878 = 0.152 ← mass of water lost

$\frac{\text{mass 6}}{\text{mass 4}} \cdot 100$ mass of water lost