



REPORT	EXPERIMENT 3	2 PAGES
ION EXCHANGE REACTIONS		
Name (Print):	Sam Pan	Student ID
AI Name:	Matt Autry	Section & Room
Before the end of the lab period, check that your ELN is saved. The report should be submitted to Gradescope by the deadline listed in the syllabus.		

Results of Ion-Exchange Reactions, pH of Solutions, and Flame Tests

1. (16 pts) Complete the columns for pH, flame color, and formulas of the major cations and anions in the data table below. Your data must match what is recorded in your ELN. When reporting the flame colors, exclude any color due to sodium contamination.

	pH	Flame Color	Formulas of Cations and Anions
Solution 1: NH ₄ Br	5	blue	NH ₄ ⁺ Br ⁻
Solution 2: BaCl ₂	5	yellow-greenish	Ba ²⁺ Cl ⁻
Solution 3: Na ₂ S	13	orange	Na ⁺ S ²⁻
Solution 4: LiOH	13	Red	Li ⁺ OH ⁻
Solution 5: CuSO ₄	4	Green	Cu ²⁺ SO ₄ ²⁻
Solution 6: AgNO ₃	5	Blue	Ag ⁺ NO ₃ ⁻
Solution 7: HCl	1	Blue	H ⁺ Cl ⁻
Solution 8: K ₂ CO ₃	13	Violet	K ⁺ CO ₃ ²⁻
Unknown Solution	5	Yellow	

2. (3 pts) Based on your experimental results, which solution(s) listed above have hydroxide ion concentrations greater than 1.0×10^{-7} M? Enter the formula(s) of the solution(s) in the box.

Na₂S, LiOH, K₂CO₃

3. (3 pts) Which of the following alkali metal ions emits photons in the visible spectrum with the longest wavelength? Circle the correct answer below.

Cu²⁺

Na⁺

Li⁺



Use mixtures A-E to answer Questions 4-6. Each mixture contains equal volumes of the two solutions listed.

A. 1.5 M HCl and 0.1 M AgNO₃

D. 0.1 M CuSO₄ and 0.1 M BaCl₂

B. 1.5 M HCl and 0.1 M NH₄Br

E. 0.1 M CuSO₄ and 0.1 M NH₄Br

C. 0.1 M BaCl₂ and 0.1 M AgNO₃

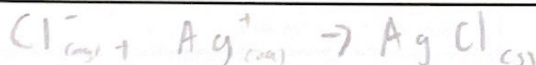
4. (3 pts) Suppose you determined a pH of 0-1 for your unknown solution. Which of the above solutions could have generated an unknown solution consistent with your pH measurement? Enter the one correct answer in the box.

B

5. (3 pts) Suppose you determined a pH of 4-5 for your unknown solution. Which of the above solutions could have generated an unknown solution consistent with your pH measurement? Enter the one correct answer in the box.

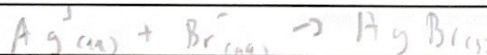
E

6. (4 pts) Solution C above cannot be a combination used for student unknowns. Write a complete and balanced net ionic equation that explains this statement.

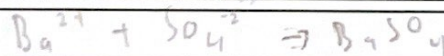


7. (15 pts) Enter a balanced net ionic equation to describe the reaction that occurred in the wells indicated. Enter NR if you think no reaction occurred. Note that if the product of a reaction is a weak/non electrolyte that is soluble in water, you may see no obvious changes.

Well # A6 (NH₄Br & AgNO₃)



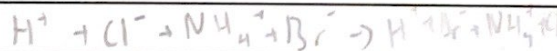
Well # B5 (BaCl₂ & CuSO₄)



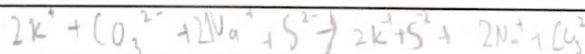
Well # D7 (LiOH & HCl)



Well # G1 (HCl & NH₄Br)



Well # H3 (K₂CO₃ & Na₂S)



8. (10 pts) The identity of your Unknown # 2213082 is

BaCl₂ and NH₄Br

9. (3 pts) Upon completion of the experiment, all solutions from the 96-well plate and one-dram vials were combined with the leftover cleaning solution of hydrochloric acid. According to the instructions, the combined solution was to be disposed of after the bubbling ceased. In the box below, write the balanced net ionic equation for the reaction that caused the bubbling.

