

Identifying an Unknown Salt Lab

Name _____

Introduction: One of the largest tasks a chemist faces is to use chemical and physical properties to identify unknown substances.

We have practiced the individual skills of identifying cations (positively charged ions) through the use of flame and bead tests by adding heat energy to a substance and observing the colors emitted as the electrons surrounding the ions collapse back to their ground states. Certain elements emit colors as they are exposed to flames; others emit their colors and become “trapped” through the use of beads. Note that there were no overlaps between the two tests. Either they had a flame test identification OR a bead test identification. If you saw a color emitted through the flame, there is no need to conduct a bead test – and vice versa.

We also practiced identifying unknown anions (negatively charged ions) through various indicator tests. There are several different types of tests we performed, each designed to identify different classes of anions.

Now it is time to put the tests together to identify the full compound – both cation and anion.

Objective: To identify the composition of multiple compounds by their flame/bead color (cation) AND the anion tests.

Materials: Those utilized in the flame test, the bead test, and the anion test.

Procedure: Follow the same procedure you have used for each of the tests to identify the full composition – cation and anion – of a set of unknown aqueous compounds. Before you begin, refer back to your previous labs and fill out this table on the back side of this sheet to assimilate all of your data into one database that will be used to determine the identity of the unknown salt.

NAME OF TEST	ION PRESENT	LAB DATA (INDICATOR AND RESULT)
Flame test (cation)		
	Lithium	
	Strontium	
	Calcium	
	Barium	
	Copper	
	Potassium	
	Sodium	
Bead test (cation)		
	Cobalt	
	Chromium	
	Manganese	
	Nickel	
	Iron	
Anion test (anion)		
BaCl₂ test	Sulfate	
	Carbonate	
	Phosphate	
AgNO₃ test	Phosphate	
	Chloride	
	Bromide	
	Iodide	
Soluble (acid and iron)	Nitrate	