Name _____ **Date** _____

Lab #5 - Flame Tests

PURPOSE: _____

_____

_____

DISCUSSION: Many ionic solids (compounds containing ions) are soluble in water. These compounds contain positive metal ions. Upon dissolving in water, these cations are mobile within the solution. In this investigation these ions are then excited by heating them in a flame upon which they impart a colored flame. Such association can be made between these colors that are emitted and various fireworks displays that you may have experienced.

PROCEDURE (MAY BE MODIFIED DUE SUPPLY SUBSTITUTION; SEE MR. ROE FOR CHANGES):

1. Clean a platinum wire or loop by dipping it in concentrated hydrochloric acid (HCl) and then begin heating it in the edge of the bunsen burner flame (non luminous portion). Repeat the dipping and heating until no color is imparted from the wire. (If it is very dirty, then clean the wire with steel wool.)

2. Table 1: Dip the clean wire or loop in a moistened sample of sodium nitrate ($NaNO_3$) and heat as shown by your instructor. Observe the color and record in Table 1. Repeat the above procedures(be sure the wire is clean before testing another metal) for compounds of barium. copper, calcium, potassium, strontium and lithium. (They do not need to be done in this order.) Observe and record the color for each in Table 1.

3. Table 2: Obtain a mixture of sodium and potassium ions. With a clean loop, observe the color and record in Table 2. Repeat this process, but this time observe the color through a piece of cobalt glass. Record the results. Now use the cobalt glass and observe the sodium and potassium ions separately. Record the results in Table 2.

DATA:

Table 1

Metal ion	**Flame color**	**p^+**	**e^-**
Sodium, Na^+	_____	_____	_____
Barium, Ba^{2+}	_____	_____	_____
Calcium, Ca^{2+}	_____	_____	_____
Copper, Cu^{2+}	_____	_____	_____
Potassium, K^+	_____	_____	_____
Strontium, Sr^{2+}	_____	_____	_____
Lithium, Li^+	_____	_____	_____

TABLE 2

	Metal ion	**Flame color**
_____	Sodium and potassium ions, Na^+ and K^+	_____
	Sodium and potassium ions Na^+, K^+ (with cobalt glass)	_____
	Sodium ions, Na^+ (with cobalt glass)	_____
	Potassium ions, K^+ (with cobalt glass)	_____

Questions:

1. Why do you think the different types of metal cations emitted different colors?

2. Explain the reason why potassium was visible when using the cobalt glass.

3. Why is it necessary use the same anion, nitrate (for example), for each solution?

4. Give at least two reasons why the flame test is sometimes invalid.