Name:	 Pd	Date:

## **Flame Test Lab**

## **Purpose**

To observe the characteristic colors produced by certain metallic ions when vaporized in a flame; and to identify an unknown metallic ion by means of its flame test.

## **Materials & Equipment**

- wooden splints
- Bunsen burner
- 7 different metals ions in solution

- spectrometer
- waste beaker with water

### **Procedure**

- 1. Fill a beaker two-thirds of the way with water to depose of used wooden splints.
- 2. Set up Bunsen burner. Adjust the gas and oxygen flow to produce a hot blue flame.
- 3. Take a wooden split from the metal ion solution and insert into flame. Before the wooden splint begins to burn, record the color of the flame and the using the spectrometer record the wavelengths of the metal's visible atomic spectrum.
- 4. Place the used splint in the waste beaker for at least one minute before disposing of splints in trash can.
- 5. Repeat steps 1 through 4 for all 6 ions.
- 6. Obtain a splint from the unknown solution. Repeat steps 1 through 4.

#### Data

Table 1 – Observed Flame Colors & Visible Atomic Spectrum Wavelengths

Solution	Metal Ion	Flame Color	Visible Atomic Spectrum Wavelength(s), nm
NaCl	Na <sup>+1</sup>		
KCI	K <sup>+1</sup>		
LiCl	Li⁺		
CaCl <sub>2</sub>	Ca <sup>+2</sup>		
SrCl <sub>2</sub>	Sr <sup>+2</sup>		
CuCl <sub>2</sub>	Cu <sup>+2</sup>		
BaCl <sub>2</sub>	Ba <sup>+2</sup>		
Unknown			

## **Data Analysis**

1. Based on the flame color what could the unknown solution be?

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Table 2 – App	oximate Visible EM Ra	adiation Emitted	
Table 2 – App	oximate Visible EM Ra Wavelength, m	adiation Emitted Frequency, Hz	Energy, J

Metal Ion	Wavelength, m	Frequency, Hz	Energy, J
Na <sup>+1</sup>			
K <sup>+1</sup>			
Li <sup>+</sup>			
Ca <sup>+2</sup>			
Sr <sup>+2</sup>			
Cu <sup>+2</sup>			
Ba <sup>+2</sup>			

# Conclusions

3.	Wh	/ did <sup>·</sup>	the	flame	color	change	before	the	wooden	splint I	began	to	burn	?
	,										6			

4. Why did the different metal ion solutions produce different colored flames?

5.	Why did the electrons gain energy?
6.	Regarding the photons emitted:  a. Where all of them in the visible range?
	b. Why or why not?
7.	What inaccuracies may be involved in using flame tests for identification purposes?
8.	What produces the atomic spectrum of an element?
9.	Define the following terms:  a. Ground state
	b. Excited state
	c. Quanta