

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 dispose 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 splint from the metal ion solution and insert into flame. Before the wooden splint begins to burn, record the color of the flame and then 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 ⁺¹		
KCl	K ⁺¹		
LiCl	Li ⁺		
CaCl ₂	Ca ⁺²		
SrCl ₂	Sr ⁺²		
CuCl ₂	Cu ⁺²		
BaCl ₂	Ba ⁺²		
Unknown	---		

Data Analysis

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

2. Based on the visible atomic spectrum wavelengths what is the unknown solution?

Table 2 – Approximate Visible EM Radiation Emitted

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

Conclusions

3. Why did the flame color change before the wooden splint began to burn?

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

