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## Experiment 14 – Atomic Spectra

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The purpose of this experiment is to show that different elements give off unique colors of light when atoms of the elements are excited by heating. By identifying the unique colors the element can be identified.

### **Part I**

There will be three gas discharge tubes set up in the lab. Observe the color of light given off by each discharge tube. Record the colors in the data table below. After recording the color of the light, observe the light through the diffraction grating (look off to one side). Draw a picture of the spectral lines. Identify the color of each line.

1. Element \_\_\_\_\_ Color of light \_\_\_\_\_

Spectral diagram:



Violet

Red

2. Element \_\_\_\_\_ Color of light \_\_\_\_\_

Spectral diagram:



Violet

Red

3. Element \_\_\_\_\_ Color of light \_\_\_\_\_

Spectral diagram:



Violet

Red

Name: \_\_\_\_\_

Section: \_\_\_\_\_

**Part II-A:**

There will be seven containers with wooden splints soaking in salt solutions. Each solution will be labeled with its chemical name.

**Procedure**

Light the bunsen burner and adjust its flame until you see a blue inner cone. Use crucible tongs to remove a splint from the soaking solution and place it in the flame. Observe the color of the flame and record the color in the table below. If two solutions give colors which seem similar, repeat the experiment until you can notice the differences in color well enough that you can describe the differences. Always use the same burner with a given chemical. If you mix up burners, you can contaminate the colors.

Chemical	Color of Flame
lithium chloride	
calcium chloride	
potassium chloride	
copper(II) nitrate	
strontium chloride	
sodium chloride	
barium chloride	

**Part II-B.**

There will be seven containers having unknown chemicals. Repeat the procedure that you used for known chemicals and identify the unknown chemicals. Record results below.

Unknown #	Color of Flame	Chemical
1		
2		
3		
4		
5		
6		
7		