# AP Chemistry 30 – Lab Activity 1: Emission Spectra

### **Learning Objective**

- Draw emission spectra for a gaseous element using a spectroscope
- Analyze emission spectra data

## **Background Information**

Every element emits

a unique range of colours called an emission spectrum. A similar spectrum, called an absorption spectrum, is produced with the same pattern when light shines through a gas and certain wavelengths are absorbed. HYDROGEN SPECTRUM Emission Spectrum Absorption Spectrum 400nm 500nm 600nm 700nm

The emission spectrum for an unknown mixture will contain the emission spectra for each element in the mixture.

## Pre-Lab

The emission spectra for four specific elements are shown.

- 1. Identify the colour of <u>brightest</u> line shown for each element based on the wavelength.
- 2. For <u>lithium</u>, determine the energy of light for each of the three lines on the emission spectrum, using the wavelengths.
- 3. For each of the two emission spectra for an unknown mixture below, identify which elements are present.





## Lab Information

Work with a partner to perform the lab. Write your own answers for the questions below.

- 1. Use the spectroscope to look at the light sources shown by Ms. Hayduk.
  - a. Write down what type of spectrum you see (continuous, emission, absorption).
  - b. Sketch the spectrum for each element on the data table.
- 2. You will be shown a mystery gas. Determine what the gas is.



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

- 3. Observe the overhead lights. Overhead lights are gas lamps with a white fluorescent coating placed on the tube. This coating distorts the spectrum and converts some blue light to red light. Use the spectroscope to identify one of the gases found in the overhead lights.
- 4. Observe an incandescent lamp. Describe this spectrum.
- 5. Observe light from the sun by looking <u>beside</u> the sun through the window. The sun displays an absorption line spectrum. Examine the solar spectrum and locate the dark absorption lines. At what wavelengths do the dark absorption lines appear?

| Light Source | Spectrum Type | Colors Observed<br>(Wavelength in thousands of Angstroms) |     |   |     |   |     |   |
|--------------|---------------|---|-----|---|-----|---|-----|---|
|              |               | 4   | 4.5 | 5 | 5.5 | 6 | 6.5 | 7 |
|              |               |   |     |   |     |   |     |   |
|              |               |   |     |   |     |   |     |   |
|              |               |   |     |   |     |   |     |   |
|              |               |   |     |   |     |   |     |   |
|              |               |   |     |   |     |   |     |   |
| Mystery Lamp |               |   |     |   |     |   |     |   |