

Exercise set six

This week will be all about spectroscopy. I'll start off class with a brief introduction to line and black-body spectra and how a spectroscope works, then you'll use spectroscopes to look at a variety of light sources.

Do all your work in your lab notebooks. I expect everyone to observe and draw each spectrum individually.

In all of your drawings: try to make clear the distinction between sharp and fuzzy lines, bright and faint lines, and regions where continuum is bright or faint.

1 Lighting Spectroscopy

Materials

spectroscope

Instructions

For each object listed below:

- describe it
- write down where you found it,
- draw its visible spectrum,
- classify its spectrum as emissions line, absorption line, blackbody, or other,
- and explain why the object has that type of spectrum.

Light sources:

1. As many different kinds of indoor light bulb (or fixture if you can't see the bulb) as you can find. Make sure one is an incandescent bulb.
2. As many kinds of outdoor lighting as you can find (you can look through the windows).
3. A blank wall (record what kind of lighting was present)
4. Something not listed above

Remember that you need a fair amount of light to be able to see a spectrum. Also make sure your spectrum isn't contaminated by some other light source.

2 Identifying lighting

Materials

spectroscope, computer with web browser, observations from exercise one

Instructions

Do this after exercise one. **Use the spectra at**

<http://ioannis.virtualcomposer2000.com/spectroscope/amici.html>

to try to identify the different kinds on lighting you viewed in exercise one.

3 Spectroscopy of known gasses

Materials

spectroscope, labeled gas discharge tubes, printout of gas spectra

Instructions

I have set up two power sources at a table with several different gasses in labeled discharge tubes. Remember that, in order to see the spectrum you need to line the light-source up with the slit. The spectrum will then appear to one side of the slit. It may take some practice to get the hang of lining the light source up in the slit.

For each gas:

- record the name
- draw its visible spectrum
- compare its spectrum to the spectrum in the printout (note any differences)

4 Spectroscopy of unknown gasses

Materials

spectroscope, unidentified gas discharge tubes, printout of gas spectra

Instructions

I have set up two power sources at a table with several different gasses in discharge tubes labeled only with a letter.

For each gas:

- record the label
- draw its visible spectrum
- identify the gas by comparing its spectrum to the spectra in the printout, or to the labeled gas tubes on the other table