

EXPERIMENT 9: FLAME TESTS AND SPECTROSCOPY

Equipment: spectroscope, gas discharge tube, Bunsen burner

Materials: NaCl, KCl, CaCl₂, SrCl₂, LiCl, BaCl₂

In this experiment you will learn which elements are used to give the different colors seen in fireworks. It will also show how the chemist can detect the presence of certain metals in compounds.

- A. Test for the metals present in each of the compounds indicated in the table below by spraying a solution of each into a Bunsen flame. Record in the table the color imparted to the flame in each case.

TABLE OF RESULTS

COMPOUNDS USED	NaCl	KCl	CaCl ₂	SrCl ₂	LiCl	BaCl ₂
COLOR OF FLAME (TO THE NAKED EYE)						

- B. The colored light observed for each salt in Part A may be a mixture of various colors. Just as white light may be broken up into its component colors by passing it through a prism or diffraction grating, so may the colored lights seen above. Place a gas discharge tube in front of a spectroscope. Allow a high voltage current from a Tesla Coil to flow into the gas tube. In your notebook, draw a diagram of what you see in the spectroscope.
- How is what you see different from what would be seen if white light was allowed to pass through the spectroscope?
 - Differentiate between Continuous Spectrum and Bright Line Spectrum.
- C. Repeat Part B for other gas discharge tubes and the mercury vapor lamp. Draw diagrams for at least two other spectra.

SUMMARY QUESTIONS

- What practical application is made by the chemist of what you have observed in this experiment?
- How would you explain the fact that when a glass tube is heated for any length of time the flame takes on a yellow color?

CONCLUSIONS

A glowing solid or liquid produces a spectrum consisting of colors. A glowing gas or vapor produces a spectrum which is different for each
 According to the Bohr Theory, the addition of sufficient energy to atoms in the gas phase causes their to jump into energy levels. When the electrons to their original energy levels, is given off in the form of light of distinct