

Energy Levels Laboratory: Veatta Berry

Teacher's Guide

Goals

- To relate period numbers with energy levels in atoms
- To show evidence of how scientists have learned about energy levels of electrons

The Laboratory

In this laboratory, students conduct flame tests, in order to gather evidence about the electronic energy layers of the different atoms. They see that different atoms glow in different colors, and discuss the reasons for this. They identify atoms in an unknown solution, from their results.

Materials for Each Group

- A Bunsen burner and matches
- Wood splints soaked with metal solutions such as Na^+ , Ca^{+2} , Ba^{+2} , Sr^{+2} , Cu^{+2} , Li^+ , and K^+
- A solution of an unknown salt

SAFETY

Wear goggles at all times during the laboratory.

When working with fire, take care not to burn your hands or equipment. Work away from flammable and explosive chemicals.

Lecture Notes

This is the beautiful crimson red, but there is another one that will be orange-reddish, and you have to be really descriptive to distinguish between them.

You are going to do an unknown, and should be able to identify it.

This is one of the fine labs.

Teaching Tips From Ms. Berry

They enjoy looking at the colors, and when they see the metal ions from the unknown, they say, "Oh, yes, I remember, this must be copper, it looks exactly like the copper solution from my known copper solution."

It's a way to first introduce them to analytical chemistry. By using the known, we can identify unknown things.

It's incorporated into the subject of electrons, and they start to see other parts of chemistry at the same time.

References: Links

<http://www.creative-chemistry.org.uk/activities/flametests.htm>

How to do flame tests in the lab, with teacher and student notes as well as technical notes.

References: Readings

Bare, W.D., Bradley, T., Pulliam, E. (1998) "An Improved Method for Students' Flame Tests in Qualitative Analysis," *Journal of Chemical Education*, Vol. 75, No. 4, p: 459.