Illinois Institute of Technology Markiyan Varhola

CHEM-124-L07 LAB CWID: 20324717

October 1, 2014

Atomic Fingerprints

**Objective:**

The purpose of this experiment was to use a hand spectroscope to identify the presence of different elements within an emitted light spectrum.

**Procedure:**

A set of hydrogen, helium, neon, argon, krypton, and mercury spectral tubes along with spectral tube power supplies were prepared and set up at different stations in the laboratory. A hand spectroscope was used to first measure a continuous spectrum of white light from an incandescent light bulb. The light spectrum was then recorded into the data table. The spectrometer was then used to observe a hydrogen gas discharge tube. The emitted lines of intense light were recorded in the data sheet. The wavelengths of these lines were calculated through electron drops from different levels, and then were compared to the observed wavelengths. The line spectra for the rest of the elements were observed and recorded. Finally, the line spectrum for a fluorescent light was recorded and compared to the previous spectra.

**Specialized Chemical Technique:**

The proper use of a hand spectroscope was observed, and proper safety precautions were taken when working with gas emission tubes and power supplies.

**Final Result:**

A continuous spectrum of white light ranged from 400nm to 700nm on the spectroscope. Hydrogen had a different emission spectrum, as it had lines of intense light rather than a continuous spectrum. Hydrogen emitted a violet light observed at 440nm, and blue-green line observed at 500nm, and the red line observed at 655nm. The calculated wavelengths for these colors were 433.3nm, 485nm, and 715.2nm, respectfully. The observed emission spectra for the other elements contained some unique signatures but were mostly comprised of similar wavelengths as the other elements.

**Conclusion:**

The emission spectrum observed from the fluorescent light contained light from range of 450nm to 650nm, which encompassed the emission spectra of all of the observed elements. Therefore, based on its atomic fingerprint, the observed fluorescent light contains Helium, Neon, Argon, Krypton, and Mercury.

**Attachments:**

* Atomic Fingerprint Data Table
* Post-Laboratory Assignment