DIFFRACTION GRATING AND EMISSION SPECTRA

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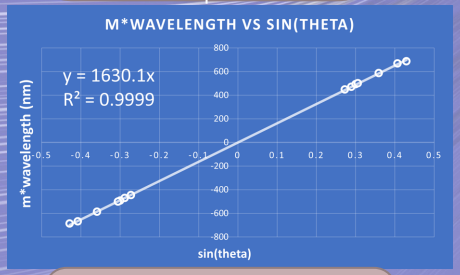
Abstract

The objective of the experiment is to measure the wavelength emitted by the gas discharge tubes to identify the element. Looking at an emission spectrum can be used to determine the composition of a material. Many astronomers use this method to identify the composition of stars and distant planets.

Electrical energy is delivered to the gas causing the electrons to become "excited" and emit light at certain wavelengths. Using a grating spectrometer to measure at which angle the colors appear. We take our measurement and use the equation n $\lambda = d\sin(\theta)$ to figure out our wavelength.



The calibration curve generated using the known emission lines of elemental helium. Calibration curves are used to ensure accuracy when determining the emission line wavelengths of unknown elements

$\theta(degrees)$	$\sin(\theta)$	$\lambda_{calculated}(nm)$	$\lambda_{known}(nm)$	% error
15.50	0.26724	436	434	0.47
17.23	0.29621	483	486	0.62
23.57	0.399987	652	656	0.61

As a check, we measured the known lines of hydrogen and obtained fairly good agreement with our calculated values using our calibration curve equation

Acknowledgments

This material is based upon work supported by the National Aeronautics and Space Administration under Grant No. NNX15AIO2H.