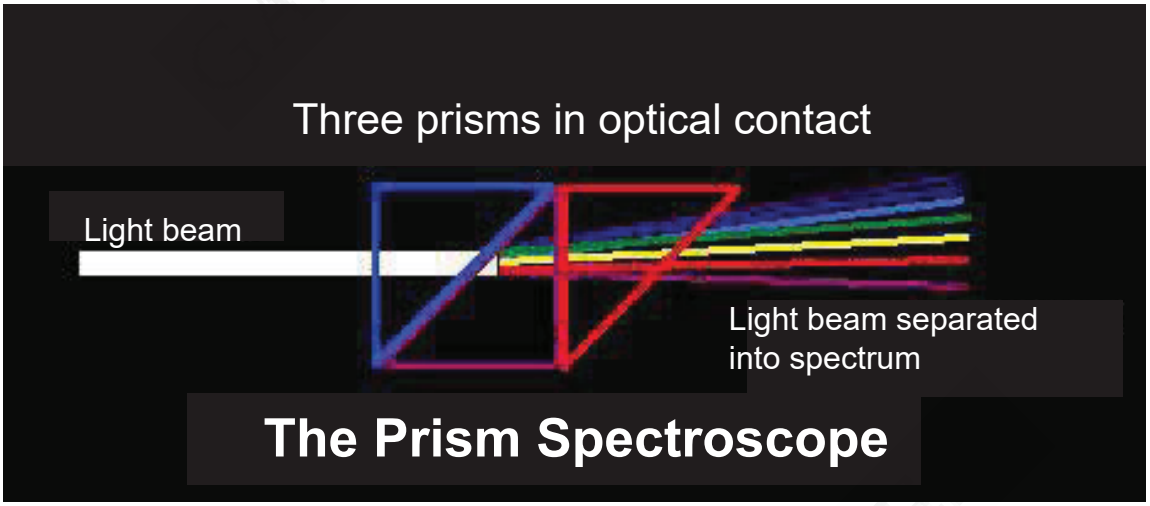
Prism & Diffraction Spectroscope Operation Manual

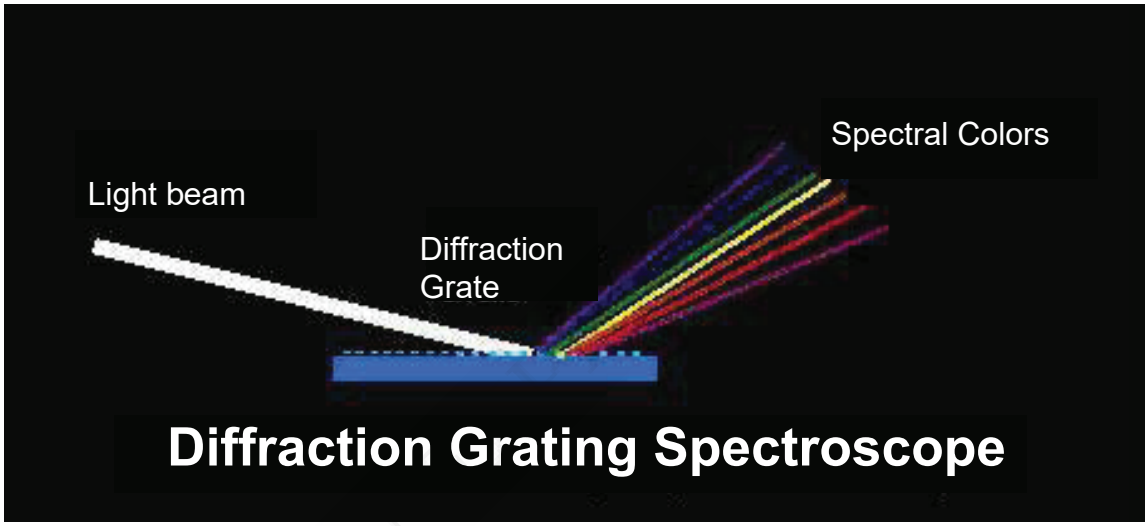
Introduction

A spectroscope is used to analyze light passing through a stone. We have two main types of spectroscopes, i.e. a prism spectroscope and a diffraction spectroscope. The prism spectroscope is composed of three optical grade glass prisms in optical contact with each other as shown below, and the diffraction grating spectroscope uses a diffraction plate to break up the light beam.

Here is how the two types work:



The Big Prism Spectroscope (CLMG-7204) will squeeze the red end of the spectrum making it difficult to see some of the absorption lines in that end. However, the prism models will usually have a focus slide control and a light slit control that allows for adjustments in the amount of light entering the unit.



The diffraction grating unit, of **Medium & Small Diffraction Spectroscope (CLMG-7205 & CLMG- 7206)**, will show a uniform spectra across the enter band, making the red end of the spectrum far easier to read than the prism.

Prism Spectroscope View

Purple Red Orange Yellow Green Blue Violet

Diffraction Grating Spectroscope View

Purple Red Orange Yellow Green Blue Violet

Instructions:

1. Choose the appropriate light source when using a spectroscope. If you don't, you end up with the absorption spectrum of the light, and not the stone. To check a light source, simple look through your spectroscope. If you see vertical lines, it's not a good light to you. The easiest way to use a spectroscope is to create a restricted light source using a strong flashlight.

2. Bring the spectroscope and your good eye up to the gemstone and find a good position for seeing the spectrum. Try turning the light source with the gem in place until nice bright flash of light from the gemstone. Put the spectroscope over that light flashing off the gem and bring my eye to it to see the fully illuminated spectrum given off by the gemstone.

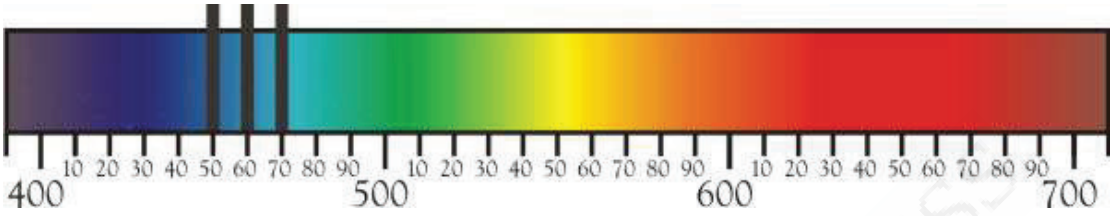
3. In the United States, spectroscopes are used with the red end to the right. In other parts of the world, the spectroscope is used with the red end to the left. This is important to remember when looking at any gemstone and comparing with reference material.

Absorption Spectrum:

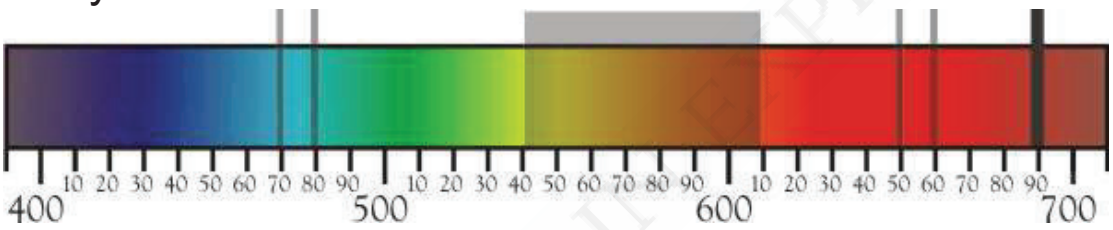
When white light travels though a stone, one or more of the wavelengths that produce color are absorbed by the gem. The colors that are NOT absorbed are the colors see when we look at the stone. The wavelengths that are absorbed by the stone are seen in the spectroscope as vertical black lines in the spectrum.

Each stone has a unique absorption spectrum (like a fingerprint of the stone). When identifying a stone we look for a spectrum that is characteristic for that stone. Here are some examples of the absorption spectrum of some gem stones.

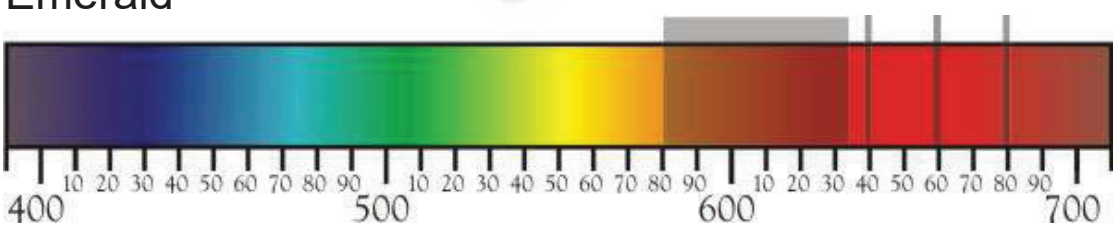
Blue Sapphire



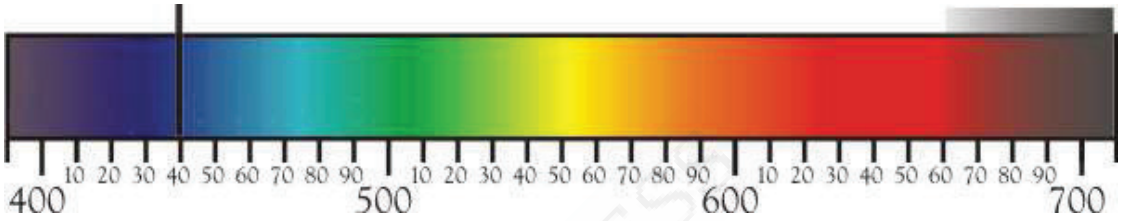
Ruby



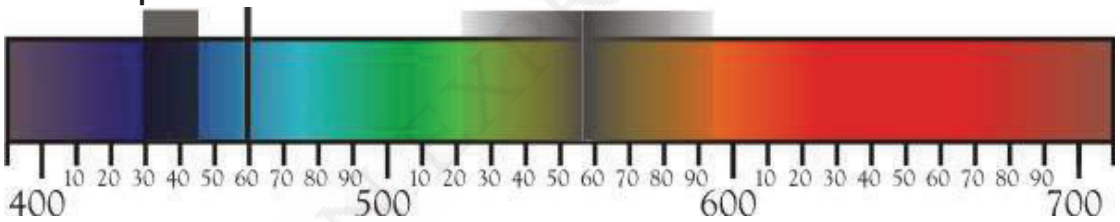
Emerald



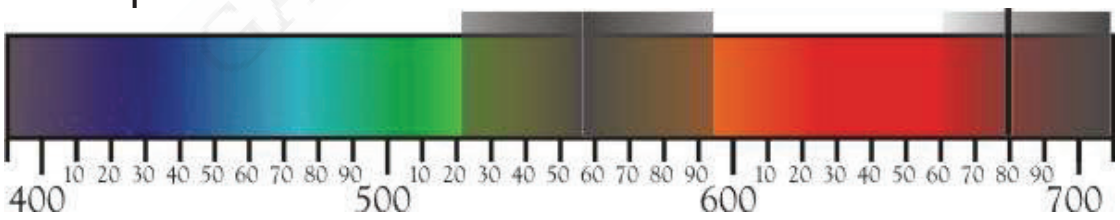
Aquamarine



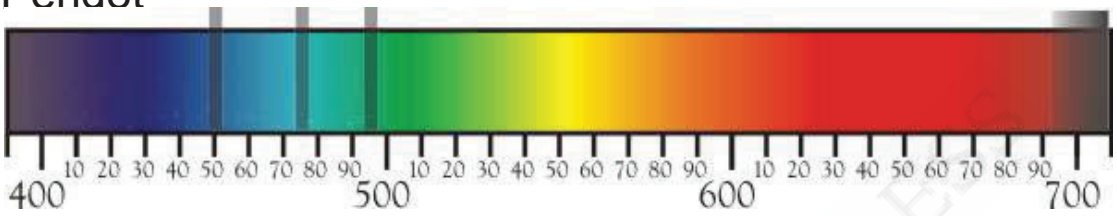
Blue Spinel



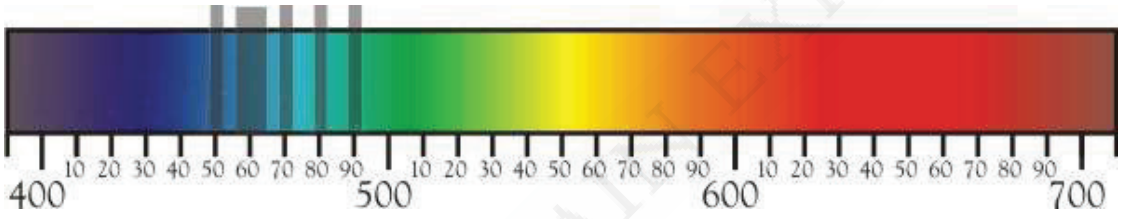
Red Spinel



Peridot



Rubellite Tourmaline



Blue Green Tourmaline