In Table 18.1 is listed the colors of the absorbed light , colors of the transmitted light (complimentary- seen) , and the approximate wavelengths. The light that is absorbed is called the spectral color and the light that is seen is the light that is transmitted. When for example red light is removed from white light (absorbed) , the eye sees the color blue-green. A typical Spectrophotometer that is often used is the Spectronic 20 or Spectronic 20D. The spectronic 20 uses a tungsten -filament as the light source powered by a power supply which yields a constant radiation intensity. A simple grating is used for diffraction. The radiation passes through the sample to a phototube. The electrical signal generated from the detector is amplified which is then used to power a meter which has a calibration scale in absorbance or transmittance. A cuvet containing the sample

Table 18.1. Visible Region Spectral Color and Complimentary Color

Wavelength (nm)	Spectral (Absorbed)	Complimentary (Transmitted)
410	Violet	Yellow
430	Indigo	Yellow
480	Blue	Orange
500	Blue-Green	Red
530	Green	Purple
560	Yellow-Lemon	Violet
580	Yellow	Indigo
610	Orange	Blue
680	Red	Blue-Green

solution is placed in the instrument for analyses. The cuvet is usually of 1 cm cell length. The extent of absorption is determined by several factors. Included among these are (1) the concentration of the absorbing species, (2) the cell thickness -width of the sample cuvet, and (3) the molar extinction coefficient - probability of light absorption.

Absorbance (A) = εbc, ε = Molar extinction coefficient, b= cell path length, c = concentration (moles / liter) . This is an expression of Beers Law.

The Molar extinction coefficient is a constant at any wavelength. If the same spectrophotometer and the same wavelength are utilized, then the absorbance will be directly proportional to the concentration. Additionally , the Absorbance is mathematically equivalent to the negative logarithm of the Transmittance, T.

$A = -\log T = \log 1/T$. The instrument often gives the % Transmittance which would be need to be changed to T by moving the decimal 2 places to the left, e.g. 80%T = 0.8T.

In this experiment, a standard curve will be prepared using absorbance measurements of known concentration solutions of $FeSCN^{+2}$. The standard curve will then be used to determine the concentrations of $FeSCN^{+2}$ in a set of unknown equilibrium solutions. The equilibria that will be investigated is that of the reaction of Fe^{+3} with SCN^{-1} to form $FeSCN^{+2}$, a transition metal complex.