

Beer's Law Experiment

Key Ideas

Spectroscopy - the use of the interaction of electromagnetic radiation to identify, quantify, or investigate the properties of matter.

Interaction of Light with Matter

Type of Radiation	Excitation	Instrument
x-rays and gamma rays	loss of inner electrons from an atom, ionization	x-ray spectroscopy
ultraviolet	loss of outer electrons from an atom, ionization; can also move electrons to a higher level	Ultra-violet spectroscopy
visible	movement of an electron from a lower to higher energy level	Visible spectroscopy
infrared	vibrations of covalently bonded molecules	Infrared spectroscopy
microwaves	rotations of covalently bonded molecules	Microwave spectroscopy
radio and TV	flipping of spins of atoms, especially Hydrogen	MRI (magnetic resonance imaging) and NMR (nuclear magnetic resonance)

Beer's Law- law which relates the amount of light absorbed by a solution to the concentration of the light absorbing species. This law says that the light absorbed is directly proportional to the concentration. Although not always true it is often true and is very useful for chemical analysis.

To Use Beer's Law to give quantitative information about a solution

1. Choose desired wavelength of electromagnetic radiation. This may involve scanning over a large wavelength range to determine what light is absorbed.
2. Use known solutions and graph absorbance versus concentration (at the desired wavelength). If a straight line is produced, then Beer's Law is obeyed.
3. Determine absorbance of unknown solution and use graph to determine the concentration that matches this absorbance.