

Research Methodology in Chemistry

Edited by
Fiona N.-F. How, Ph.D



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RESEARCH METHODOLOGY IN CHEMISTRY

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CHAPTER – 3

INSTRUMENTATIONS FOR CHEMICAL ANALYSIS

Shafida Binti Abd Hamid

Infrared Spectrometer

Infrared (IR) light is situated between visible and microwave lights of electromagnetic spectrum. Infrared spectroscopy is a common tool for chemists as it can be used to identify the types of bonds or functional groups in a molecule (Figure 3.1). Some compounds (particularly organic compounds) absorb particular wavelengths of infrared radiation, and convert it to molecular vibration energy (bending and stretching). The instrument does not provide the detailed molecular structure of a molecule, thus, it is normally used complimentary to Nuclear Magnetic Resonance (NMR) spectrometer (Rouessac and Rouessac, 2007).



Figure 3.1 Infrared Spectrometer

The IR spectrum gives a plot of wavenumbers, $\bar{\nu}$ (cm^{-1} , X-axis) versus % transmittance, T (Y-axis) (Figure 3.2). The band intensities can also be expressed as absorbance (A), while wavenumbers can be represented as wavelength:

$$A = \log_{10}(I/T)$$