UV VISIBLE SPECTROMETER (SHIMADZU 2450)

Ultraviolet-visible (UV-vis) spectroscopy is used to obtain the absorbance spectra of a compound in solution or as a solid. What is actually being observed spectroscopically is the absorbance of light energy or electromagnetic radiation, which excites electrons from the ground state to the first singlet excited state of the compound or material. The UV-vis region of energy for the electromagnetic spectrum covers 1.5 - 6.2 eV, which relates to a wavelength range of 800 - 200 nm. UV-vis spectroscopic data can give qualitative and quantitative information of a given compound or molecule.

FOURIER TRANSFORM INFRARED SPECTROSCOPY (PERKIN ELMER SPECTRUM TWO)

The use of Fourier Transform Infrared spectroscopy (FTIR) has been considered to be one of the most effective techniques to study and understand the chemical and surface chemistry in various types of membranes.FTIR is a

technique which is used to obtain infrared spectrum of absorption, emission, and photoconductivity of solid, liquid, and gas. It is used to detect different functional groups in PHB. FTIR spectrum is recorded between 4000 and 400 cm^{-1}.

THERMOGRAVIMETRY (PERKIN ELMER STA 6000)

Thermogravimetry (TGA) is a dynamic combination of the gravimetric analysis with oven drying. It records over time both the weight of the specimen and the temperature of a small oven until the specimen reaches a constant weight, i.e. from m_M to m_O. The continuous record shows anomalies in water release and the temperature at which the anomalies had occurred (e.g. release of crystallization water or condensation reactions), or the onset of degradation mechanisms with emission of gases (e.g. emission of CO_2, NH_3). TGA is more sophisticated than gravimetry because it provides elements to interpret the final reading, is faster, and requires smaller specimens.

SPECTRO FLUOROMETER (SHIMADZU RF 6000)

A spectro fluorometer is an instrument which takes advantage of fluorescent properties of some compounds in order to provide information regarding their concentration and chemical environment in a sample. A certain excitation wavelength is selected, and the emission is observed either at a single wavelength, or a scan is performed to record the intensity versus wavelength, also called an emission spectrum.

POLARIZER MICROSCOPE (MOTIC BA310 POL)

Polarized light is a contrast-enhancing technique that improves the quality of the image obtained with birefringent materials when compared to other techniques such as dark-field and bright-field illumination, differential interference contrast, phase contrast, Hoffman modulation contrast, and fluorescence. Polarized light microscopes have a high degree of sensitivity and can be utilized for both quantitative and qualitative studies targeted at a wide range of anisotropic specimens. Qualitative polarizing microscopy is very popular in practice, with numerous volumes dedicated to the subject. In contrast, the quantitative aspects of polarized light microscopy, which is primarily employed in crystallography, represent a far more difficult subject that is usually restricted to geologists, mineralogists, and chemists. However, steady advances made over the past few years have enabled biologists to study the birefringent character of many anisotropic sub-cellular assemblies.

Electrochemical Workstation (Biologic VSP)

Electrochemical workstation provides several techniques (cyclic voltammetry, linear sweep voltammeter differential pulse voltammetry, square wave voltammetry, chronoamperometry, impedance spectroscopy, etc.) windows-based software, integrated digital CV simulator, impedance simulation and fitting program. These features provide powerful tools for the understanding of reaction kinetics, trace level analysis, fundamental research, corrosion, energy

conversion and storage studies. Electrochemistry is a major technique for studying and understanding the redox chemistry of metal complexes. Another important aspect of the electrochemistry of metal complexes is that the principles of metal complex catalysis can be transferred to the catalysis of electrochemical reactions. The electrode can replace oxidants or reductants to generate selectively low- or high-valent metal species, and active intermediates through coordination of substrates at a metal center. The objective of electrocatalysis is to drive highly efficient and selective oxidation or reduction of substrates, at modest potential and in mild, clean conditions. Studies on electrocatalysis with metal complexes are also of great interest for the understanding of catalytic redox processes, especially those involving model complexes of metalloenzymes.

Glove Box

A glovebox (or glove box) is a sealed container (class III biosafety cabinet) that is designed to allow one to manipulate objects where a separate atmosphere is desired. Built into the sides of the glovebox are gloves arranged in such a way that the user can place their hands into the gloves and perform tasks inside the box without breaking containment. Part or all of the box is usually transparent to allow the user to see what is being manipulated.