Measurement of: Electron Paramagnetic resonance (EPR) measurements

Equipment: Electron Paramagnetic resonance (EPR) spectrometer

Property Measured: (i). Magnetic anisotropy, (ii). Spin dynamics
(iii).Relaxation behaviour
(iv). Defects in crystals
(v). Free radicals containing unpaired electron
(vi). Spin concentration
(vii). Superparamagnetic

Photograph: EPR spectrometer

Basic Principle:

The difference between the energies of two possible spin states of a free electron in an applied magnetic H is $\Delta E = g\mu_B H$ where μ_B is Bohr's magnetron and g is the Landé factor (almost exactly equal to 2 for a free electron). The absorption of electromagnetic radiation at the resonance frequency $v = \Delta E/h$ induces transitions from the low-energy level to the higher level. The resonance frequency lies in the X-band between 9-10 GHz.

Capabilities:

Magnetic Field	**up to 15 kG**
Microwave Source	**X- Band (9.5 GHz)**
Sensitivity	**2.5 x 10^9 spins/Gauss**
Temperature	**300 K**
Accessories	**(i). UV irradiation** **(ii). Goniometer** **(iii). Cylindrical cavity**

Sample Requirement: (a). Thin films (3 x 3 mm) (b). Powder samples (~ 8 mg) (c). Liquid samples, single crystal (toxicity should be mentioned)