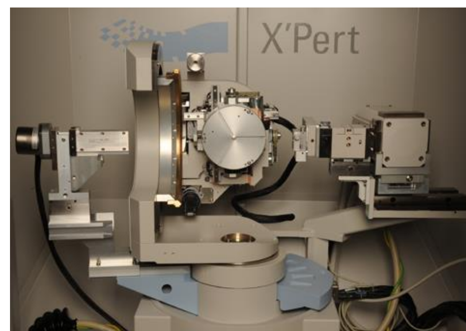
Measurement of: High Resolution X-ray Diffractometry cum Reflectometry

Equipment: . PANalytical X'Pert PRO MRD systems

Property Measured: Epitaxial films are nearly-perfect crystalline films and contain a low dislocation density. Properties of these films are largely determined by their composition and structure. Information from these layers, such as layer thickness, composition, strain and relaxation, can be obtained by measuring rocking curves and reciprocal space maps using high-resolution optics. Degree of crystalline perfection of single crystals can be evaluated. Reflectivity can be used to evaluate the layer parameters such as thickness and density, interface and surface roughness. Reflectometry is applied to characterize single and multi-layer structures and coatings from amongst many others, magnetic, semiconducting and optical materials.

Photograph (small size)



Basic Principle: High-resolution diffraction experiments require a highly monochromatic beam with a well defined wavelength and equatorial divergence. PANalytical X'Pert PRO MRD systems can be configured with a hybrid monochromator or a high-resolution monochromator to fulfil these requirements. With PANalytical's X'Pert PRO MRD system, an X-ray mirror and a high-resolution monochromator can be placed in line to deliver an incident X-ray beam that is not only highly monochromatic with a low divergence, but also has a high intensity. This high intensity is used to uncover the weakest details in a diffraction experiment.

Capabilities: High quality single crystals, epitaxial thin films, poly crystalline multilayer thin films and amorphous thin films, depth profiling, reciprocal space mapping.

Sample Requirement: Both sides should be flat and minimum size should be $5x5mm^2$ and maximum $100x100mm^2$