

# **Fundamentals and Applications of X-Ray diffraction**

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Today advanced thin film structures, such as, LEDs, photovoltaic solar cells devices, Hard Discs, IC are being created in variety of crystallographic forms: epitaxial, polycrystalline, micro-crystalline, nano-crystalline or amorphous. Critical structural and microstructural parameters of these devices are directly related to their performance. Taking into account the large range of materials and structures used in building these devices there are a large variety of x-ray diffraction and scattering techniques and geometries that can be used for characterization: x-ray diffraction for phase ID, texture analysis, high-resolution x-ray diffraction, diffuse scattering, x-ray reflectivity. Modern laboratory instrumentation is capable of performing all the scattering and x-ray diffraction experiments in one system with no compromise on intensity and resolution. The present talk is providing an overview of the available x-ray scattering methods and geometries in the state of the art laboratory XRD systems.