

X-ray Diffraction Techniques for Characterization of Thin Film Solar Cells

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Currently high efficiency thin film photovoltaic solar cells devices are being created in variety of crystallographic forms: epitaxial, polycrystalline, microcrystalline or amorphous. Critical structural and microstructural parameters of these devices are directly related to the performance of the solar cell. Taking into account the large range of materials and structures used in building the solar cells there are a large variety of x-ray diffraction and scattering techniques and geometries that can be used for characterization of solar cell device. The present contribution is providing an overview of the available x-ray scattering methods and geometries available for characterization of this type of structures: x-ray diffraction for phase ID, texture analysis, high-resolution x-ray diffraction, diffuse scattering, x-ray reflectivity. The advantages and limitations of the various techniques are discussed.