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Characterization Techniques for Studying Properties of Nanomaterials

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Abstract : Monitoring the characteristics of a nanostructured material comprises measurements of structural, morphological, mechanical, optical and electronic properties of the synthesized nanopowder and different layers and coatings of nanomaterials coated on transparent conducting oxides (TCOs) substrates like fluorine doped tin oxide (FTO) or Indium doped tin oxide (ITO). This article focuses on structural and optical characterization with emphasis on measurements of the photocatalytic efficiency as a photocatalyst and their interpretation to extract relevant information about various TCOs and materials, their emitter regions, and surface passivation. It also covers a brief description of techniques based on photoluminescence that can portray high resolution pictorial graphs for application as solar energy devices. With the advancement in the scientific techniques, detailed information about the structural, morphological, and optical properties can be investigated, which is further useful for engineering and designing of an efficient device. The common principles involved in the prevalent characterization techniques aid to illustrate the range of options that can be broadened in near future for acurate device characterization and diagnosis.

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