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CIGS THIN FILMS FOR SOLAR CELL APPLICATIONS

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ABSTRACT:

This chapter reports the deep introduction of thin film CIGS solar cells and shows the advantages of CIGS solar cells over other thin film based solar cells. Optical parameters like absorption coefficient, extinction coefficient, optical band gap, refractive index are also discussed in this chapter. Various CIGS thin film deposition techniques, and many CIGS solar cell efficiencies achieved by different researchers are also discussed in this chapter.

INTRODUCTION:

For the last few decades, researchers have been focused on developing clean, renewable energy resources, and definitely will be useful in the near future; to switch carbon based energy resources such as oil, gas and coal. Renewable energy is increasingly viewed as critically important globally. The depletion of fossil fuel demands to exploration the substitute renewable energy resources for wrapper the energy crisis in the imminent decade [1-4]. A very standard renewable source called photovoltaic device is foreseen to solve energy problem, which transfigures directly the solar energy from sun to the electrical energy. Lot of research has been carried out in improving solar cells efficiency. In this regard, most of the compound semiconductors like CdTe, ZnSe ,CZTSSe, CIGS, CdSe etc. have been served for photovoltaic device applications. The major benefit of these compound semiconductors over elemental semiconductors like silicon and germanium is that they make available a wide variety of energy gaps and mobility's, so that materials are available with properties that meet specific requirements. For example, the optimum band gap for producing maximum efficiency in solar cells is 1.5 eV for terrestrial power generation (AM1.5 spectrum) which is very close to the energy band gaps of compound semiconductors [4]. However the single crystalline silicon based solar cells enhance the efficiency up to 26.5% for commercial products [5] but the cast of these