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A REVIEW OF PHOTOVOLTAIC TECHNOLOGY FOR ELECTRICITY GENERATION

Abstract: *One of the most inexhaustible and the cleanest renewable energy resources is the solar energy. Photovoltaic (PV) technology is one of the finest ways for using the solar power. In the recent years, the world`s development of PV technology is growing very fast because of the technological development and government support for renewable energy. Photovoltaic is playing an important role to utilize solar energy for electricity production worldwide. The efficiency of solar cells is one of the important facts in PV technologies. This paper represents the review of the photovoltaic technology based upon the silicon solar cells. Also, the paper reviews the non-silicon photovoltaic technology, based upon Cadmium telluride (CdTe) and Cadmium sulphide (CdS), Copper indium gallium selenide/copper indium selenide (CIGS/CIS), Dye-sensitized solar cell (DSSC) and some new photovoltaic technology for PV cell production - Nanotechnology or ''third- generation PV''. Very important perspective of thin film PV technology is flexible modules, and this study will show that there is great perspective for development thin film building integrated PV products.*

Keywords: *Photovoltaic, Solar cells, Silicon technology, Non-silicon technology, New PV technology, building integrated photovoltaic*

1. INTRODUCTION

One of the most promising renewable energy technologies is photovoltaic (PV) energy conversion. PV energy conversion represents the direct conversion of sunlight into electricity. Commercial PV materials commonly used for PV systems include solar cells of silicium (Si), cadmium-telluride (CdTe), coper-indium-diselenide (CIS) and solar cells made of other thin layer materials. PV systems are still an expensive option for producing electricity compared to other energy sources, but many countries support this technology. Over the last five years, the global PV industry has grown more than 40 % each year [1].

PV is currently a technically and commercially mature technology able to generate and supply short/mid-term electricity using solar energy. However, the current PV installations are still small and provide only 0.1 % of world total electricity generation but through some market report indicated that PV installations are growing at 40 % average annual rate [2, 3]. Silicon is a leading technology in making solar cell, due to its high efficiency. But many researchers, due to its high cost, are trying to find new technology to reduce the material cost for production of solar cells and thin film technology can be seen as a suitable substitution.

However, the efficiency of this technology based solar cells is still low, and researchers are intensively making an effort to enhance the efficiency. [3,4]. Flexible modules are light-weight and suitable for applications where weight is important, and they offer a much faster payback than products based on conventional photovoltaics [5]. It is expected that they will play a very important role in the world PV market in the near future, especially for building integrated systems. In this paper the review of the photovoltaic technology based upon the silicon and non-silicon solar cells is given.

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