

THIN FILM PHOTOVOLTAIC TECHNOLOGIES: STATUS AND PERSPECTIVES

TANKOSLOJNE FOTONAPONSKE TEHNOLOGIJE: TRENUTNO STANJE I IZGLEDI

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Today, the renewable energy systems have a significant impact on the environment. One of the most promising renewable energy technologies is photovoltaic (PV) energy conversion, which 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. In this paper we will focus on the different thin film photovoltaic technologies, actual market situation and future challenges arising with growing PV demand. Also we will point out the advantages of the thin film photovoltaic technology for building integration, because the Building integrated Photovoltaic (BIPV) market is still one of the big hopes for thin film technologies.

Keywords: Thin film Photovoltaics, technology, building integration.

U današnje vreme sistemi koji koriste obnovljivu energiju imaju značajan uticaj na životnu sredinu.

Jedna od najperspektivnijih tehnologija koje koriste obnovljivu energiju jeste pretvaranje fotonaponske energije, što predstavlja direktno pretvaranje sunčeve svetlosti u električnu energiju. Komercijalni fotonaponski materijali koji se koriste za fotonaponske sisteme obuhvataju solarne ćelije od silicijuma (Si), kadmijum telurida (CdTe), bakar idmijum diselenida (CIS) i solarne ćelije napravljen od drugih tankoslojnih materijala. U ovom radu se razmatraju različite tankoslojne fotonaponske tehnologije, trenutna situacija na tržištu i budući problemi koji budu nastajali sa povećanom potražnjom za fotonaponskom energijom. Takođe se ukazuje na prednosti tankoslojne fotonaponske tehnologije za integraciju u zgradama, zbog toga što tržište fotonaponskih ćelija integrisanih u zgradama i dalje predstavlja jednu od velikih nada za tankoslojne tehnologije.

Keywords: tankoslojna fotonaponska; tehnologija; integracija u zgadi

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].

Starting from 1990 industry of photovoltaic conversion of solar irradiation shows constant annual economical growth of over 20 %, and from 1997 over 33 % annually. In 2000 total installed capacities worldwide have surpassed 1000 MW, and in developing countries have overreached more than million house-holds which are using electrical energy generated by means of the photovoltaic systems. It is predicted that PV will deliver about 345 GW by 2020 and 1081 GW by 2030. [2].

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 solar cells based on this technology is still low, and researchers are intensively making an effort to enhance the efficiency. [3].

In this paper, it is analyzed the current status of the PV market and technology, and different thin film technologies, [4] based upon amorphous-silicon (a-Si), cadmium telluride (CdTe), copper indium gallium

