Book review

SOLAR ENERGY IN SERBIA, GREECE AND THE REPUBLIC OF SRPSKA

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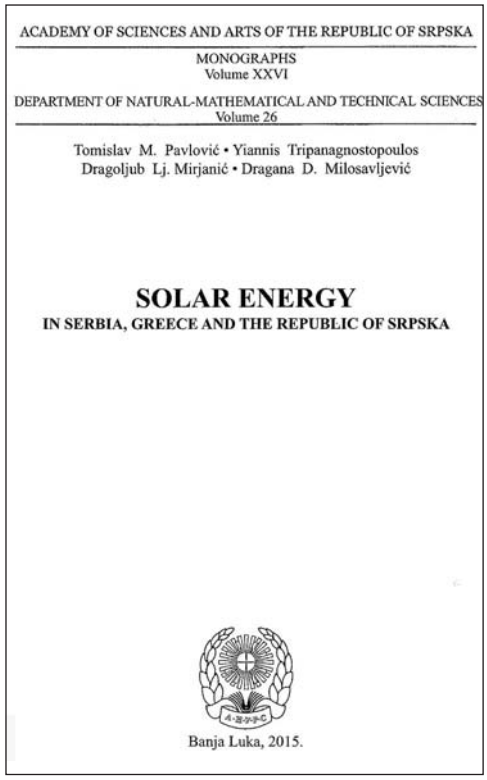
Publisher:

Academy of Sciences and Arts of the Republic of Srpska
Department of Natural-Mathematical and Technical Sciences
Monograph, Vol. XXVI
ISBN:978-99938-21-70-0, Banja Luka, 2015



At the beginning of September 2015 the Academy of Sciences and Arts of the Republic of Srpska has published in English language a monograph SOLAR ENERGY in Serbia, Greece, and the Republic of Srpska authored by the academician Tomislav M. Pavlović, prof. Dr. Yiannis Tripanagnostopoulos, academician Dragoljub Lj. Mirjanić, and reasearch assistant Dr. Dragana D. Milosavljević.

Monograph has 694 pages, 8 chapters (*Solar energy, Photothermal solar energy conversion, Photovoltaic solar energy conversion, Solar architecture, Solar energy materials characterization, Solar energy in Serbia, Solar energy in Greece, and Solar energy in the Republic of Srpska*), 553 figures, 77 tables, 367 references, and 151 authors references. Monograph has cited 57 authors' SCI/SCIE lists papers and 94 out of SCI/SCIE lists papers.

The first chapter *Solar energy* focuses on the *composition of the Sun, atmosphere of the Sun, etymology of the solar energy, extraterrestrial solar radiation, terrestrial solar radiation, solar radiation measurement, measurement of the sunshine duration, measurement of the direct solar radiation intensity, and measurement of the total and diffuse solar radiation intensity*.

The second chapter *Photothermal solar energy conversion* focuses on the *Low temperature solar energy conversion* (flat plate collectors with fluid and air, current and daily efficiency of flat plate collectors, solar boiler, solar system with natural and forced water circulation, solar pools), *Medium temperature solar energy conversion* (vacuum collectors with concentrators, solar ovens), and *High temperature solar energy conversion* (heliostats, high

temperature solar ovens, concentrating solar power plants – CSP, parabolic trough power plants, solar tower power plants, parabolic dish power plants, power plants with Fresnel reflectors, comparison of different types of CSP plants, examples – CSP plants in the world, parabolic trough power plants, solar tower power plants, parabolic dish power plants and power plants with Fresnel reflectors).

The third chapter *Photovoltaic solar energy conversion* focuses on the *Solar cells* (output parameters of solar cells, factors influencing solar cells efficiency, types of solar cells-monocrystalline, polycrystalline and amorphous silicon solar cells, GaAs solar cells, CdTe solar cells, CIS solar cells, Cu2S/CdS solar cells, solar cells application- stand-alone photovoltaic systems, components of the stand-alone photovoltaic solar systems, determining of the characteristics of the stand-alone photovoltaic solar system, grid connected photovoltaic solar system), *PV solar plants* (fixed PV solar plants, one-axis tracking PV solar plant, dual- axis tracking PV solar plant, review of the installed PV solar plants, softwares for the calculation of the PV solar plants energy efficiency- PVGIS, Homer, SWERA, RETScreen, solar databases - NASA - Surface meteorology and solar energy database and PVGIS solar database) and *Photovoltaic/Thermal solar collectors* (introduction, design and operation of PV/T collectors, the effect of temperature to PV cell electrical efficiency, the effect of illumination to PV cell electrical efficiency, design principles of flat plate PV/T collectors, concentrating PV/T collectors, design and cooling modes of concentrating photovoltaics, the booster diffuse reflector concept, PV/T collector test results, environmental aspects of PV/T collectors, PV/T collector performance, PV/T collector analysis principles, flat plate PV/T collectors with liquid heat recovery, PV/T water collector energy balance equations, the thermal and electrical parts of PV/T collectors, flat plate PV/T collectors with air heat recovery, pressure drop, PV/T -air collectors in forced air flow, PV/T-air collectors in natural air flow, PV/T collector performance improvements, modified PV/T collectors, modified PV/T collectors with improvements, hybrid PV/T system design considerations, the PVT/DUAL system concept, application of PV/T collectors, PV/T collectors in the built environment, thermosiphonic PV/T solar water heaters, PV/T-TC combined systems, Fresnel/PVT system for solar control of buildings, other CPVT collector designs, PV/T collectors in industry and agriculture, PV/T collectors for the industry, PV/T collectors in the agriculture, PV/T collectors combined with other renewable energy sources and conclusions).

The fourth chapter *Solar architecture* focuses on the *Passive solar architecture* (building orientation, shades, windows, thermal curtains, wall and furniture colors, Tromb's wall, active massive wall, water wall, phase changing heat storages, glass veranda, floor heat storage) and *Building integration of solar energy systems* (introduction, building integration aspects, solar energy systems for building integration, building integrated photovoltaics (BIPV), efficiency aspects of BIPVs, the BIPVT concept, other BIPV aspects, building integrated solar thermal systems (BISTS), definitions and design aspects of BISTS, passive solar systems, architectural integration of solar thermal systems, aesthetical possibilities, unglazed solar thermal collectors, environmental benefits of using BISTS, hybrid Photovoltaic/Thermal solar systems, building integrated concentrating Solar energy systems and operational and architectural aspects for BICPVT systems) for solar energy materials characterization.

The fifth chapter *Solar energy materials characterization* focuses on the *Interactions of electrons with specimens* and also of *Methods and devices* (scanning electron microscopy, electron microprobe, Auger electron spectroscopy, spectrophotometer with Ulbricht's sphere, emisiometer, elipsometer, solar radiation simulator).

The sixth chapter *Solar energy in Serbia* focuses on the *General information about solar energy in Serbia* (geographical position, climate, solar radiation and air pollution in Serbia,

renewable energy policy in Serbia, current state of solar energy use in Serbia, low, medium, high temperature and photovoltaic solar energy conversion, PV solar plants in Serbia, other applications of solar cells, solar architecture, perspectives of the solar energy use in Serbia, Solar energy laboratory at the Faculty of Science and Mathematics, University of Nis, Solar energy laboratory at the Technical faculty "Mihajlo Pupin" in Zrenjanin) and *Results obtained in Solar energy laboratory at the Faculty of Science and Mathematics, University of Nis* – 13 papers on SCI list (Optical and microstructural properties of anodically oxidized aluminium, Optical properties of spectrally selective anodically coated electrolytically colored aluminium surfaces, Amorphous silicon solar cells on anodically oxidized aluminium substrate, Influence of physical characteristics of flat aluminum concentrators on energy efficiency of PV/Thermal collector, Optimal design of orientation of PV/T collector with reflectors, Comparison and assessment of electricity generation capacity for different types of PV solar plants of 1 MW in Soko Banja, A review of concentrating solar power plants in the world and their potential use in Serbia, Assessment and potential use of concentrating solar power plants in Serbia, Possibility of electricity generation using PV solar plants in Serbia, Simulation of PV systems electricity generation using Homer software in specific locations in Serbia, Assessment of the possibilities of building integrated PV systems of 1 kW electricity generation in some spa resorts in Serbia, Performance analysis of a grid connected PV solar plant in Niš, Republic of Serbia and A practical field study of performances of solar modules at various positions in Serbia).

The seventh chapter *Solar energy in Greece* focuses on the *General information about solar energy in Greece* (geographical position, climate in Greece, solar radiation in Greece, renewable energy policy in Greece, current state of solar energy use in Greece, perspectives of solar energy use in Greece, Solar energy laboratory at the Department of Physics, University in Patras) and *Results obtained in Solar energy laboratory at the Department of Physics University of Patras* – 10 papers on SCI list (Hybrid Photovoltaic/Thermal solar systems, Improved PV/T solar collectors with heat extraction by forced or natural air circulation, Air-cooled PV/T solar collectors with low cost performance improvements, Aspects and improvements of hybrid photovoltaic/thermal solar energy systems, Performance, cost and life cycle assessment study of hybrid PVT/air solar systems, Solar collectors with colored absorbers, The Fresnel lens concept for solar control of buildings, New designs of building integrated solar energy systems, ICS solar systems with two water tanks, Aspects of PV/T Solar System Application for Ventilation Needs in Greenhouses).

The eighth chapter *Solar energy in the Republic of Srpska* focuses on the *General information about solar energy in the Republic of Srpska* (geographical position, climate in the Republic of Srpska, solar radiation in the Republic of Srpska, renewable energy policy in Bosnia and Herzegovina, current state of solar energy use in the Republic of Srpska, perspectives of solar energy use in the Republic of Srpska, solar energy laboratory at the Academy of Sciences and Arts in the Republic of Srpska) and *Results obtained in solar energy laboratory at the Academy of Sciences and Arts in the Republic of Srpska* – 11 papers on SCI list (Assessment and potential use of concentrating solar power plants in the Republic of Srpska, Assessments and perspectives of PV solar power engineering in the Republic of Srpska (Bosnia and Herzegovina), Energy efficiency of PV solar plant in real climate conditions in Banja Luka, Investigation of the polycrystalline solar modules energy efficiency in relation to their geographical orientation and tilt angle, Articles of physical characteristics of some thin film materials).

After each chapter there is a list of references that can guide the reader and help him/her to better understand the given subject matter. At the end of the monograph a list of authors' references cited in it, is given.

Scientific contribution of the monograph is reflected in the successful presentation of the original scientific results obtained by the authors who were published in the international referred journals and presented in the international and national conferences. This is primarily relevant for the collectors with spectrally selective absorbers of solar radiation on electro-chemically colored anodically oxidised aluminum, hybrid collectors with amorphous and monocrystalline silicon solar cells with and without concentrators of solar radiation, amorphous silicon solar cells on anodically oxidised aluminum, photovoltaic solar power plants, solar thermo power plants with solar radiation concentrators, photovoltaic/thermal collectors construction, characteristics and applications, building integration of solar energy systems *etc*.

According to its contents and the number of the authors' citations a monograph represents a remarkable work in the area of solar energy in the Republic of Serbia, Greece and the Republic of Srpska and can be qualified as a distinguished monograph of the international significance.

This monograph can be very useful to the physics, technical sciences and occupational safety students at the basic academic, master and doctoral studies levels, experts in the industry and wider in solving the problems in the area of solar energy in the Republic of Serbia, Greece and the Republic of Srpska.

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