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Employment and positions

Ph.D. Zbigniew Starowicz is employed as an assistant professor at the Institute of Metallurgy and Materials Science of the Polish Academy of Sciences.

Scientific Career

M.Sc.: AGH-University of Science and Technology, Renewable Energy Sources 2011
Ph.D.: Institute of Metallurgy and Materials Science, Polish Academy of Sciences, 2015

Scientific achievements

30 published items among them: **20** papers in peer-reviewed scientific journals included in the Web of Science database. **33** conference presentations.

The most relevant publications during last 5 years

1.

M Musztyfaga-Staszuk, **Z Starowicz**, P Panek, R Socha, K Gawlińska-Nęcek, The influence of material parameters on optical and electrical properties of indium-tin oxide (ITO) layer, Journal of Physics: Conference Series, Volume 1534, MicroTherm 2019 - Microtechnology and Thermal Problems in Electronics 24-26 June 2019, Lodz, Poland

2.

Z. Starowicz, K. Gawlińska - Nęcek, R.P. Socha, T. Płociński, J. Zdunek, M.J. Szczerba, P. Panek, Materials studies of copper oxides obtained by low temperature oxidation of copper sheets, Materials Science in Semiconductor Processing 121 (2021) 105368, https://doi.org/10.1016/j.mssp.2020.105368

3.

A. Bigos, M. Wolowicz, M. Janusz-Skuza, **Z. Starowicz**, M.J. Szczerba, R. Bogucki, E. Beltowska-Lehman, Citrate-based baths for electrodeposition of nanocrystalline nickel coatings with enhanced hardness, Journal of Alloys and Compounds 850 (2021) 156857, https://doi.org/10.1016/j.jallcom.2020.156857

4.

E. Korzeniewska, J. Sekulska-Nalewajko, J. Gocławski, R. Rosik, A. Szczęsny, **Z. Starowicz**, Surface Morphology Analysis of Metallic Structures Formed on Flexible Textile Composite Substrates, Sensors 2020, 20, 2128; doi:10.3390/s20072128

5.

P. Sawicka-Chudya, G. Wisz, M. Sibiński, **Z. Starowicz**, Ł. Głowa, M. Szczerba, M. Cholewa, Performance improvement of TiO2/CuO by increasing oxygen flow rates and substrate temperature using DC reactive magnetron sputtering method, Optik - International Journal for

Light and Electron Optics 206 (2020) 164297

6.

Z. Starowicz, K. Gawlińska-Nęcek, M. Bartmański, M. Wlazło, T. Płociński, B. Adamczyk-Cieślak, G. Putynkowski, P. Panek, Investigation of the Zn and Cu oxides for heterojunction thin film solar cell application, Microelectronic Engineering 221 (2020) 111196, DOI: 10.1108/mi-12-2018-0087

7.

P. Sawicka-Chudy, **Z. Starowicz**, G. Wisz, R. Yavorskyi, Z. Zapukhlyak, M. Bester, Ł. Głowa, M. Sibiński, M. Cholewa, Simulation of TiO2/CuO solar cells with SCAPS-1D software, Materials Research Express, (2019) vol. 6, 8, https://doi.org/10.1088/2053-1591/ab22aa

8.

K. Gawlińska-Nęcek, **Z. Starowicz**, D. Tavgeniene, G. Krucaite, S. Grigalevicius. E. Schab-Balcerzak, M. Lipiński, A solution-processable small-organic molecules containing carbazole or phenoxazine structure as hole-transport materials for perovskite solar cells, Opto-Electronics Review 27(2):137-142, https://doi.org/10.1016/j.opelre.2019.04.003

9.

K. Drabczyk, P. Sobik, **Z. Starowicz**, K. Gawlińska, A. Pluta, B. Drabczyk, Study of lamination quality of solar modules with PMMA front layer, Microelectronics International, Vol. 36 No. 3, pp. 100-103. (2019) https://doi.org/10.1108/MI-12-2018-0087

10.

K. Gawlińska, K. Drabczyk, **Z. Starowicz**, P. Sobik, B. Drabczyk, P. Zięba, Determination of EVA cross-linking degree after lamination process by extraction and optical transmission measuring, Arch. Metall. Mater. 63 (2018), 2, 833-838, DOI: 10.24425/122411

11.

G. Kulesza-Matlak, K. Gawlińska, **Z. Starowicz**, A. Sypień, K. Drabczyk, B. Drabczyk, M. Lipiński, P. Zięba, Black silicon obtained in two-step sort wet etching as a texture for silicon solar cells - surface microstructure and optical properties studies, Arch. Metall. Mater. 63 (2018), 2, 1009-1017, DOI 10.24425/122436

12.

Z. Starowicz, R. Wojnarowska-Nowak, P. Ozga, E. M. Sheregii, The tuning of the plasmon resonance of the metal nanoparticles in terms of the SERS effect, Colloids and Polymer Science (2018) vol. 296, Iss. 6, pp.1029-1037, https://doi.org/10.1007/s00396-018-4308-9

13.

Z. Starowicz, K. Drabczyk, K. Gawlińska, P. Zięba, Metrological Aspects of Evaluation of Glass Types Used in photovoltaic modules, Metrol. Meas. Syst., Vol. 25 (2018) No. 1, pp. 203-211. DOI: 10.24425/118161

14.

Z. Starowicz, K. Gawlińska, J. Walter, R.P. Socha, G. Kulesza-Matlak, M. Lipiński, Extended investigation of sol aging effect on TiO2 electron transporting layer and performances of perovskite solar cells, Materials Research Bulletin 99 (2018) 136-143

15.

Z. Starowicz, A. Kędra, K. Berent, K. Gawlińska, K. Gwóźdź, E. Zielony, G. Kulesza-Matlak, R.P. Socha, K. Drabczyk, E. Płaczek-Popko, M. Lipiński, Influence of Ag nanoparticles microstructure on their optical and plasmonic properties for photovoltaic applications, Solar Energy158, 2017, 610-616

16.

M. Lipiński, R.P. Socha, A. Kędra, K. Gawlińska, G. Kulesza-Matlak, Ł. Major, K. Drabczyk, K. Łaba, **Z. Starowicz**, K. Gwóźdź, A. Góral, E. Popko, Studying of Perovskite Nanoparticles in PMMA Matrix Used as Light Converter for Silicon Solar Cell, Arch. Metall. Mater. 62 (2017), 3, 17331-1739

17.

K. Gawlinska, A. Iwan, **Z. Starowicz**, Grazyna Kulesza-Matlak, K. Stan-Glowinska, M. Janusz, M. Lipinski, B. Boharewicz, I. Tazbir, A. Sikora, Searching of new, cheap, air- and thermally stable hole transporting materials for perovskite solar cells. Opto-Electronics Review 25 (2017) 274-284

Research Projects

Projects from National Science Centre:

-

OPUS 16, project no. 2018/31/B/ST8/03294, - Preparation and characterization of new materials for perovskite solar cells, Contractor, 2019-2022

-

Preludium 7, Influence of parameters of the photochemical process of deposition of metal nanoparticles on the basis of titanium dioxide on plasmonic properties of obtained nanostructures project no. 2014/13/N/ST8/00858 place of realization: IMMS PAS, 2015-2017 manager and main contractor of the project

-

Preludium 6, Selection and detailed analysis of the directional texture of surface crystallization of crystalline silicon for improvement of optoelectronic properties, place of performance: project no . 2013/09/N/ST8/04165, IMMS PAS, 2014-2015 nature of participation: contractor

Projects from National Centre for Research and Development

-

Development of technology for manufacturing of functional materials for application in non-silicon photovoltaic cells, TECHMATSTRATEG II, Main contractor in IMMS PAS,

2019-2021

-

Development of a hybrid photovoltaic cell, POIR.01.01.01-00-1022 / 15-00, RDCTI and IMIM PAS, 2017-2018, contractor.

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Development of a technology for the production of copper component and paste used in the production process of electrical contacts of silicon cells, POIR.01.01.01-00-1598 / 15-00, RDCTI and IMIM PAS, 2016-2018, contractor.

-

Innovative flexible photovoltaic cover, GEKON2 / O4 / 268473/23/2016, IMMS PAS, 2016-2017, contractor.

Scientific experience gained at home and abroad:

-

Scientific internship as part of the Erasmus program, Organic luminescent concentrators in liquid crystal matrices, the Netherlands, TUE, Eindhoven, 20/03/30/03/2017,

-

Scientific internship, Institute of Physics PAS in Warsaw, 21-25.07.2014.

-

Online course "Solar Cells, Fuel Cells and Batteries" organized by Stanford University completed with honors (October 2013-January 2014) Scientific internship under the program Erasmus, Turkey, TÜBİTAK MAM Chemistry Institute, Gebze, Kocaeli, 26/09/04/10/2013,

-

Scientific internship, Institute of Catalysis and Surface Chemistry PAS in Krakow, April - May 2013,

-

Postgraduate studies Professional head of research and development projects, University of Agriculture in Krakow, 1/10/2012, 30/06/2013,

-

Training Nano-scale Materials and Advanced Characterization Techniques, Germany, Technical University of Dresden, 5-6.12.2012,

-

Training "Dissemination of achievements of Polish and world photovoltaic in the process of higher education - II edition" organized by the Photovoltaic Laboratory of the IMMS PAS (February 2011-June 2011)

Prizes and awards:

DOCTUS doctoral scholarship for 2012-2015

1st place for the best speech at the 3rd Photovoltaic and Transparent Electronics Symposium on Development Perspectives (Świeradów-Zdrój) 2012

Education of scientific staff:

Co-supervisor of 1 doctoral dissertation, Marta Janusz 2017.

Reviewer: Materials Science Poland, Archives of Metallurgy and Materials,

Main scientific interests:

Materials for photovoltaics, physicochemistry and photovoltaic cell technology., nanotechnology, plasmonics, nanostructured materials. Silicon, thin-film, perovskite, third-generation solar cell, light management cells. Optical techniques for the characterization of photovoltaic materials.