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b. Phone.: (033) 8174249

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Employment and positions

1984 Institute of Non-ferrous Metals in Gliwice – technician, 1989 Institute of Solid State Physics, Polish Academy of Sciences in Zabrze – assistant, 1992 Mineral and Energy Economy Research Centre, Polish Academy of Sciences in Cracow – assistant professor, 1997 Institute of Metallurgy and Materials Science, Polish Academy of Sciences in Cracow – assistent professor.

Scientific Carrier

M.Sc.: Silesian University in Katowice, Department of Physics, 1982

Ph.D.: Institute of Metallurgy and Materials Science, Polish Academy of Sciences, 2006

Scientific achievements

148 papers, among them: 48 of them citetd by the Institute for Scientific Information in Philadephia,, 48 presentations during conferences, 1 chapter in book.

The most relevant publications during last 5 years

1.

B. Swatowska, **P. Panek**, ,,The impact of shading on solar cell electrical parameters", Optica Applicata, vol. XLVII, No.2, (2017), p. 319-323.

2.

M. Musztyfaga-Staszuk, Ł. Major, G. Putynkowski, A. Sypień, K. Gawlińska, **P. Panek**, P. Zieba, „ New kind of Cu based paste for Si solar cells front contact formation", Materials Science-Poland, 36, (2018), p. 469-476.

3.

M. Musztyfaga-Staszuk, G. Putynkowski, R. Socha, M. Stodolny, **P. Panek**, „Copper-based volumetric filler dedicated for Ag paste for deposition the front electrodes by printing on solar Si cells", Materials, 11, (2018), p. 1-13.

4.

M. Musztyfaga-Staszuk, D. Janicki, **P. Panek**, „Correlation of different electrical parameters of solar cells with silver front electrodes", Materials, 12, (2019), p. 1-12.

5.

B. Swatowska, **P. Panek**, D. Michoń, A. Drygała, „The influence of emitter resistance on the electrical parameters of mono- and multicrystalline silicon solar cells", Microelectronics

International, 36, (2019), p. 90-94. https://doi.org/10.1108/MI-04-2019-0019

6.

Z. Starowicz, K. Gawlińska-Nęcek, M. Bartmański, M. Wlazło, T. Płociński,M. 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. https://doi.org/10.1016/j.mee.2019.111196.

7.

M. Musztyfaga-Staszuk, **P. Panek**, "The use of laser at various stages of the manufacturing process of solar cells based on crystalline silicon", Solid State Phenomena, 308, (2020), p. 138-156. doi: 10.4028/www.scientific.net/SSP.308.138

8.

M. Musztyfaga-Staszuk, D. Janicki, K. Gawlińska-Nęcek, R. Socha, G. Putynkowski, **P. Panek**, "Copper Oxides on a Cu Sheet Substrate Made by Laser Technique", Materials, 13, (2020), 3794, p. 1-11. doi:10.3390/ma13173794

9.

Z. Starowicza, 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, p. 1-7. doi:10.1016/j.mssp.2020.105368

10.

B. Swatowska, P. Panek, T. Stapinski, "The investigation of PV systems quantum efficiency in various irradiation condition", Optics & Laser Technology, 137, (2021), 106830. doi.org/10.1016/j.optlastec.2020.106830

Research Projects

-

Development of technology for manufacturing of functional materials for application in non-silicon photovoltaic cells. Nr TECHMATSTRATEG 2/409122/3/NCBR/2019. menager, 1.03.2019 - 30.03.2022

Common research within the scientific network

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EKOENERGIA- New ecological and save technologies in energy production and conversion, IMP PAS, contractor, 2006-2007

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PV-TECH- Development of new technologies and research techniques for silicon solar cells, IMMS PAS, contractor, 2008

International exchange programmes

-

Application of macroporous silicon to silicon solar cells, Laboratoire de Chimie Metallurgique des Terres Rares, CNRS, Thiais, Francja, 2003-2005.

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In-line processing of n+/p and p/p+ junction systems for cheap photovoltaic module production, Projekt konsorcjum Instytutu Metalurgii i Inżynierii Materiałowej PAN, Instytutu Katalizy i Fizykochemii Powierzchni PAN w Krakowie, SINTEF - Norwegia. 2014-2016, projekt finansowany przez NCBiR w ramach norweskiego mechanizmu finansowania. POL-NOR/199380/89/2014
task manager for Work Package 1
-„Front and back doping of Si wafers by low cost method".

Experience gained abroad:

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PHASE - CNRS, Strasburg, France, September 1992 - research collaboration

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NATO - Advanced Study Institute - Photovoltaic and Photoactive Materials, Sozopol, Bulgaria, 2001 (14 days) - training

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Laboratoire de Chimie Metallurgique des Terres Rares – CNRS, Thiais, France, 2002, 2003 (two weeks each) - research collaboration Institut d'Electronique du Solide et des Systèmes ,

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CNRS – Universite Louis Pasteur, Strasbourg, France, 2007 (two months) – research contractIn stitut d'Electronique du Solide et des Systèmes ,

-

CNRS – Universite Louis Pasteur, Strasbourg, France, 2008 (two months)– research contract

-

Stiftelsen SINTEF, Institute Material and Chemistry, Strindveinen 4, 7465 Trondheim, Norway, 21 - 28.10.2014.

Education of scientific staff

Superviser of 4 M.Sc. thesis: Grzegorz Holtzer (2006), Anna Byrska (2008), Paweł Kędzior (2010), Bernadeta Klimek (2013)

Organisation of conferences and scientific events

Member of organization committee:

PV-TECH Development of new technologies and research techniques for silicon solar cells, reporting meeting, Kozy, 2008

I Photovoltaic Polish Country Conference, 8 - 11 October 2009, Krynica-Zdrój
II Photovoltaic Polish Country Conference, 12 - 15 May 2011, Krynica-Zdrój
European Photovoltaics Summer School, 4 - 7 July 2012, Krakow, Poland

Membership in professional societies

Member of Scientific Board of IMMS PAS Cracow 2007 – 2010, 2019-2022

Distinctions

Bronze Cross of Merit, President of Poland, Krakow 2012

Main scientific interest
Mono- and multicrystalline silicon thick films solar cells technology. Chemical etching, texturization and cleaning for Si wafers, diffusion of phosphorous and boron dopants deposited from gaseous and liquid phases and surface passivation by thermal oxide processes. Laser fired point contacts. Porous silicon. Encapsulation processes of PV modules. Metal oxides as functional layers in solar cells application, ALD processing.