



## Science and Technology Conference „Polyurethanes 2013 – current development trends” 13-16 October 2013, Ustroń, Poland



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*Piotr Król*

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[Wodorozcieńczalne wyroby poliuretanowe](#)

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[Trends in the production and scientific research on polyurethane composites](#)

*Letizia Verdolotti, Marino Lavorgna, Ernesto Di Maio, Salvatore Iannace*

[New trends in the field of sustainable hybrid-polyurethane foams](#)

*Leonard Szczepkowski, Aleksander Prociak, Joanna Ryszkowska*

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[Versatile Utilization of Nanostructures in Polyurethane Chemistry](#)

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*Leszek Żabski, Józef Papiński*

[Pianki poliizocyanurowe- otrzymanie i właściwości](#)

*Mikelis Kirpluks, Uģis Cabulis, Laura Stiebra, Andris A. Avots*

[Nano particle influence on high density rigid polyurethane foams obtained from recycled resources](#)

*Joanna Paciurek-Sadowska, Bogusław Czupryński, Joanna Liszkowska*

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*Janusz Datta, Józef Haponiuk, Ewa Głowińska, Marcin Włoch*

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*Katarzyna Z. Gaca, Aleksander Prociak*

[Two step polyol synthesis from rapeseed oil: economical and ecological advances](#)

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[The nanoparticles application in the limiting of polyurethane's combustion](#)

[Wykorzystanie nanocząstek w zmniejszeniu palności poliuretanów](#)

*Bartłomiej Waśniewski, Monika Auguścik, Małgorzata Krzyżowska, Piotr Orłowski, Joanna Ryszkowska*

[The influence of diisocyanates on the structure and properties of polycarbonate urethanes intended for applications in intervertebral disc implants](#)

[Poliwęglanouretany do zastosowań na implanty krążka kręgowego – wpływ zastosowanych diizocyanianów na właściwości wytworzonych materiałów](#)

*Mariusz Rasek, Robert Penczek, Stanisław Makarski, Jan Franek*

[Evaluation of performance characteristics of isocyanate based injection materials](#)

**Science and Technology Conference Programme**  
**„Polyurethanes 2013 – current development trends”**  
Ustroń, 13-16 October 2013  
Hotel „Muflon”

**13.10.2013 Sunday**

Arrival to the hotel, accommodation.

**17.00-21.00 Coffee, tea, hot refreshments**

**14.10.2013 Monday**

**8.00 Breakfast**

9.00 - 9.10 Conference opening

9.10 - 9.40 F. Bareiro: *Water-based polyurethane dispersions: chemistry, technology and applications*

9.40 - 11.00 Presentation of Enterprises (2-3 min for each presentation of participants and their enterprises)

**11.00 - 11.20 Coffee break**

**11.20 - 13.20 Current trends and novel solutions in polyurethane synthesis**

(4 oral presentations, each lasting 30 minutes including 5 minutes for discussion)

- P. Król: *Waterborne polyurethane products.*
- J. Ryszkowska: *Polyurethane composites.* *Azksuan*
- L. Verdolotti, M. Lavorgna, E. Di Maio, S. Iannace: *New trends in the field of sustainable hybrid-polyurethane foams.*
- L. Szczepkowski, A. Prociak, J. Ryszkowska: *Development of polyurethanes for automotive industry.*

**13.30 Lunch**

**15.00-17.15 Various aspects of polyurethanes' syntheses and applications**

(5 oral presentations, each lasting 25 minutes)

- T. Vlcek: *Versatile utilization of nanostructures in polyurethane chemistry.*
- A. Eceiza: *High renewable carbon content polyurethanes and their nanocomposites.*
- B. Pilch-Pitera: *New trends of development of polyurethane powder lacquers.*
- M. Alessandrini: *CANNON AFROS – Excellence in dosing and mixing.*
- G. Mitchener: *„20 to 2” – Agile NPD for chemical industry.*

**17.15-17.30 Coffee break**

**17.30-19.00 Poster session**

Information about posters (3 minutes per each poster)

**19.30 Barbeque: Business in highland-style**

**15.10.2013 Tuesday**

**8.00 Breakfast**

9.00-11.00 Novel components and polyurethane materials (4 oral presentations, each lasting approximately 30 minutes)

- U. Cabulis: *Balance between renewable and recyclable polyols in rigid polyurethane foams.*
- L. Żabski, J. Papiński: *Rigid polyisocyanurate foams – properties and application.*
- M. Kirpluks, U. Cabulis, L. Stiebra, A.A. Avots: *Nanoparticle influence on high density rigid polyurethane foams obtained from recycled resources.*
- J. Paciorek-Sadowska, B. Czupryński, J. Liszkowska: *The application of selected ash fraction for modification of the properties of rigid PUR-PIR foams.*

**11.00-11.20 Coffee break**

**11.20-13.00** (4 oral presentations, each lasting 25 minutes)

- J. Datta, J. Haponiuk, E. Głowińska, M. Włoch: *Chemical recycling of polyurethanes using novel bio-based glycols.*
- K. Gaca, A. Prociak: *Two step polyol synthesis from rapeseed oil - economical and ecological advances.*
- H. Pawlik, T. Vlček: *Lipase catalyzed synthesis of green polyol for polyurethanes.*
- W. Zatorski, O. Gałkowska: *The nanoparticles application in the limiting of polyurethanes combustion.*

**13.15-15.00 Lunch**

**15.00-16.40 Testing and application of polyurethane materials** (4 oral presentations, each lasting 25 minutes)

- B. Waśniewski, M. Auguścik, M. Krzyżowska, P. Orłowski, J. Ryszkowska: *Polycarbonateurethanes as a materials for an intervertebral disc implants – influence of the diisocyanates on properties of the obtained materials.*
- M. Rasek, R. Penczek, S. Makarski, J. Franek: *Evaluation of performance characteristics of isocyanate based injection materials.*
- B. Zajac: *Potentials of using PUR in structural joints in civil engineering in aspect of thermal work.*
- G. Mitchener: *„Od 20 do 2” – Holistic NPD for chemical industry.*

**16.40-17.00 Coffee break**

**17.00-19.00 „Polyurethanes 2013” – Round Table Discussion**

Moderators: Leonard Szczepkowski, Aleksander Prociak

**Issues:** What threatens polyurethanes in the 21st century?

**Discussion subjects:** **Expansion of PUR over the last 76 years and directions of further development.**

- prices of polyurethanes,
- toxicity and ecology of polyurethanes' resources,
- application difficulties,
- utility hazards (VOC, smell, traces of aromatic amines, hydrolysis to carcinogenic compounds, TDI migration, fire hazards, toxicity of fumes),
- pressure to lower the prices and change application properties,
- competitiveness of cheaper and safer materials,
- development of PUR in the light of UE regulations,
- other subjects raised by the participants.

**19.00 Official adjournment**

**20.00 Dinner gala**

**16.10.2013 Wednesday**

**8.00 Breakfast. Send-off of the conference participants. Departures**

## **Water-based polyurethane dispersions: Chemistry, Technology and applications**

**Isabel Fernandes<sup>1</sup>, Mário Rui Costa<sup>2</sup>, Maria-José Ferreira<sup>3</sup>, Filomena Barreiro<sup>1\*</sup>**

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Over the past few decades, polyurethane-polyurea aqueous dispersions (PUDs) have developed a solid reputation for high performance applications, particularly in the field of adhesives and coatings. PUDs are mostly environmentally compatible products; they are totally devoid or contain only low amounts of volatile organic compounds (VOC). This is an important feature in view of the present environmental policies where governments and internal agencies are placing emphasis on developing sustainable processes, improving work conditions and reducing emissions of toxic and polluting substances into the atmosphere.

In the past years, our research group has been involved in the development of polyurethane-polyurea aqueous dispersions for two main applications (footwear and indirect food contact). With this work we intend to review this theme and describe some of the achieved developments. Characterization of commercial dispersions will be presented and examples of synthesis will be described, following a modified pre-polymer process developed in our group.

**Keywords:** Polyurethanes, Aqueous dispersions, Solvent-free