

Institute of Macromolecular Chemistry,
Czech Academy of Sciences
Heyrovského nám. 2, 162 06 Prague 6
Czech Republic



• Visegrad Fund



8th Workshop on Green Chemistry and Nanotechnologies in Polymer Chemistry

6–8 September 2017
Prague
Czech Republic

BOOK OF ABSTRACTS AND PROGRAMME

8th Workshop **GREEN CHEMISTRY** and **NANOTECHNOLOGIES** in Polymer Chemistry

Friday, 8 September 2017

LECTURE SESSION: From renewable resources to polymers

Chaired by: Maria Filomena Barreiro (Portugal)

- 9:00 – 9:40 Invited lecture IL-02
Alessandro Gandini (*France*)
The Diels-Alder reaction applied to polymers from renewable resources: Thermal reversibility and recyclability
- 9:40 – 10:10 Keynote lecture KL-04
Aleksander Prociak (*Poland*)
Rigid polyurethane foams modified with lignin based bio-polyols
- 10:10 – 10:30 Oral communication OR-14
Mikelis Kirpluks (*Latvia*)
Investigation of tall oil fatty acid epoxidation kinetics
- 10:30 – 10:50 Oral communication OR-15
Maria Kurańska (*Poland*)
Synthesis and characterization of bio-polyols from post-used vegetable oils
- 10:50 – 11:10 Oral communication OR-16
Paulina Parcheta (*Poland*)
Fully bio-based polyester polyols for polyurethanes

11:10 – 11:35

Coffee break

LECTURE SESSION: Polyurethanes and environment

Chaired by: Aleksander Prociak (Poland)

- 11:35 – 12:05 Keynote lecture KL-05
Ugis Cabulis (*Latvia*)
Mechanical and thermal properties of polyurethane foams obtained from renewable and recyclable components

KL-04

RIGID POLYURETHANE FOAMS MODIFIED WITH LIGNIN BASED BIO-POLYOLS

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Nowadays, a large number of polyurethane (PU) systems modifications relies on the use of different bio-polyols, as described in literature. Among them, one of the most important is the incorporation of bio-polyols based on plant wastes such as lignin.¹ In this work, two bio-polyols have been synthesized from a technical lignin and applied to obtain rigid PU foams (10-30wt. in polyol premix). The lignin, obtained by an organosolv process (aqueous ethanol) proceeds from hardwoods and was converted into liquid bio-polyols by an oxypropylation process.² The addition of the lignin-based bio-polyols to the PU system increased its reactivity, as confirmed by a faster decrease of the dielectric polarization and an increase of the maximum temperature in the foam core during the foaming process. The foam modified with these bio-polyols had a slightly lower apparent density and compressive strength. The obtained foams have an apparent density and a closed cell content of about 40 to 45 kg/m³ and 86-89%, respectively. The compressive strength of the foams decrease as the bio-polyol content increased. On the other hand the thermal conductivities of the obtained materials were similar ca. 23 mW/m·K. Concerning thermal stability, lignin-based foams start to degrade at lower temperatures and show a slower degradation pattern (high residue in TG).

1. Prociak A., Kurańska M., Malewska E., *Polimery*. 62(5), 353-363, 2017.

2. Cateto C. A., Barreiro M. F., Rodrigues A.E, Belgacem, M. N., *Ind. Eng. Chem. Res.* 48(5), 2583-2589, 2009.

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