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/m^3 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.

Acknowledgement: *POCI-01-0145-FEDER-006984 (LA LSRE-LCM), funded by ERDF, through POCI-COMPETE2020 and FCT; Project NORTE-01-0145-FEDER-000006, funded by NORTE2020 under PT2020, through ERDF.*