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

12:05 – 12:25	Oral communication OR-17 **Isabel P. Fernandes** *(Portugal)* Development of a modified pre-polymer method to produce NMP-free polyurethane-urea aqueous dispersions
12:25 – 12:45	Oral communication OR-18 **Patrycja Maria Jutrzenka Trzebiatowska** *(Poland)* Characterization of cast polyurethanes with high content of recycled polyol
12:45 – 13:05	Oral communication OR-19 **Sylwia Członka** *(Poland)* Natural oils as a chain extenders in the synthesis of rigid polyurethane foams
13:05 – 14:30	*Lunch*

LECTURE SESSION: Structured hydrogels and hybrid polymers

Chaired by: Alessandro Gandini (France)

14:30 – 15:00	Keynote lecture KL-06 **Miroslava Dušková** *(Czech Republic)* Microstructured pHEMA-hydrogels as sustainable materials for biological studies
15:00 – 15:20	Oral communication OR-20 **Maria Lujan Auad** *(USA)* Interpenetrating hydrogel networks for use in tissue engineering and agricultural applications
15:20 – 15:40	Oral communication OR-21 **Kamol Dey** *(Italy)* Preparation and assessment of high performance gelatin-based hydrogels for tissue engineering
15:40 – 16:00	Oral communication OR-22 **Alexandra Gârea** *(Romania)* Organic-inorganic hybrid polymer: A new organophylization agent for layered silicates
16:00 – 16:10	**Closing ceremony**
16:10 – 16:40	*Farewell coffee*

OR-17

DEVELOPMENT OF A MODIFIED PRE-POLYMER METHOD TO PRODUCE NMP-FREE POLYURETHANE-UREA AQUEOUS DISPERSIONS

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A modified pre-polymer process was developed for the synthesis of NMP (N-methyl-2-pyrrolidone)-free polyurethane-urea aqueous dispersions. The pre-polymer process is based on the use of dimethylol propionic acid (DMPA, hydrophilizing diol), which requires dissolution in NMP to be introduced in the reactive mixture. NMP is difficult to remove from the dispersion remaining in the final product. In this work we present a modified pre-polymer process composed by four main stages: (1) pre-polymer synthesis in two stages: (i) reaction of the isocyanate with the polyol at 80ºC, and (ii) introduction of DMPA pre-neutralized in acetone and proceeding of the reaction at 50ºC, (2) Pre-polymer dispersion in water, (3) Chain extension with a diamine; and (4) Co-solvent removal. Several dispersions were synthesized using different DMPA contents (3.0, 4.0, 5.0%, keeping the pre-neutralization degree at 100.0%), and different DMPA pre-neutralization degree (100.0 and 90.0%, using 5.0 % of DMPA). The effect of these variables in the particle size and dispersion stability was evaluated. Based on the obtained results, the modified pre-polymer process is a feasible alternative to obtain NMP-free PUD, thus fulfilling the restrictions imposed by the European Union.

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