

## Research Trip Summary Report

### Task 2. Foreign mobility of WUST doctoral students

#### I. Data of the doctoral student

1. Full name: Paweł Piszko
2. Year of studies: 3<sup>rd</sup> year of Doctoral School
3. Educational discipline: Chemical Engineering

#### II. Foreign research trip (research visit)

1. Research institute in which the foreign research was implemented: Martin Luther University of Halle-Wittenberg, Chemistry Department
2. Name and surname of the host person (mentor): Prof. Dr. Jörg Kreßler
3. Dates of the research trip: 01-31.10.2021
4. Title and date of a seminar delivered during the research trip: Microporous composite materials from poly(glycerol sebacate) for bone tissue engineering, date of seminar: 27.10.2021
5. Description of work carried out during the research trip:

Investigation of CALB-mediated enzymatic synthesis of poly(glycerol sebacate) in 1,4-dioxane from sebacic acid and glycerol. Carrying out reactions in different temperatures and analyzing main product after 24h as well as aliquotes taken every 2 hours for the first 12 hours by means of FT-IR, GPC and <sup>1</sup>H NMR. After optimization of reaction, a scale up process was performed for the reaction in 40°C for 12 hours. Final products will be submitted for cross-linking optimization after coming back to WUST. Moreover, the reactions with excess of sebacic acid were investigated as well as reactions with dimethyl sebacate (instead of acid).

6. Description of the main results obtained:

After performing CALB-mediated polycondensation reactions using equimolar ratio of sebacic acid and glycerol at 40, 50 and 60°C polymers were evaluated in terms of molecular mass distribution using GPC and their structure confirmed using <sup>1</sup>H NMR. Results indicated reaction at 40°C as the one with highest molar mass (6.4 kDa) after 12 hours (after 24 hours enzymatic degradation was observed). Therefore this reaction was submitted for scale-up process (performed 6 times). Other reactions (excess of sebacic acid and with dimethyl sebacate) resulted with polymers with low molar mass (oligomers) and require further optimization.

7. Future collaborations (if applicable):

Mutual scientific publication regarding optimization of poly(glycerol sebacate) prepolymer synthesis with multiple synthetic pathways and further cross-linking optimization.

8. Title and date of a seminar presenting the results of the trip delivered at Wrocław University of Science and Technology after returning from the research trip:

**III. Doctoral student's signature**

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(Date)

.....  
(doctoral student's signature)

**IV. Confirmation and information from the host**

1. Confirmation of compliance of the information contained in the report: I CONFIRM / DO NOT CONFIRM. *(In justified cases, the confirmation of the host may be sent by e-mail to the Dean's Office of the Doctoral School email: [interdocschool@pwr.edu.pl](mailto:interdocschool@pwr.edu.pl))*

2. Additional information and comments

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(Date)

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(signature(s) of Host)