

DMP title

Project Name DMP_Rhea - DMP title

Project Identifier 88366

Grant Title 1216222N

Principal Investigator / Researcher Rhea Verbeke

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Description Desalination membranes have the potential to help alleviate the global water crisis as they allow the production of fresh water from saline or waste waters. Polyamide membranes have been the state of the art for 40 years, but have failed to expand to new application fields due to their limited chemical stability. A new generation of chemically robust, salt-rejecting membranes is thus highly desired for applications in harsh aqueous media (e.g., oxidizing, acidic, and caustic conditions, solvent-containing waters, and cleaning products). The key objective of this postdoc is to take advantage of the high chemical resistance of epoxide-based polymers to fabricate the first water purification membranes offering both high salt selectivity and excellent chemical robustness. Recently, the applicant synthesized the first epoxide-based membrane using interfacial polymerization. Here, epoxide interfacial polymerization will be developed as a novel platform chemistry for membrane synthesis by investigating innovative polymerization conditions and strategies, establishing membrane synthesis-property-performance relationships, and elucidating ion transport mechanisms. These fundamental insights combined with the high versatility of epoxide chemistry will yield tailor-made membranes that will be tested for challenging applications, such as the desalination of chlorine-containing sea waters, and the selective removal of rare earth metals from acid mine effluents.

Institution KU Leuven

1. General Information

Name applicant

Rhea Verbeke

FWO Project Number & Title

1216222N

Affiliation

- KU Leuven
- Other

Other:

JGU Main

Technion - Israel Institute of Technology

2. Data description

Will you generate/collect new data and/or make use of existing data?

- Generate new data

Describe in detail the origin, type and format of the data (per dataset) and its (estimated) volume. This may be easiest in a table (see example) or as a data flow and per WP or objective of the project. If you reuse existing data, specify the source of these data. Distinguish data types (the kind of content) from data formats (the technical format).

Type of data	Format	Volume	How created	Generated by
Membrane preparation and upscaling parameters	.xlsx	5 GB	Parameters entered in an .xlsx document by the researchers	KU Leuven
Membrane performance (flux, selectivity)	.xlsx	15 GB	Generated by in-house developed high-throughput gas separation equipment	KU Leuven
Data generated from general characterization	.xlsx	15 GB	Data generated from Thermogravimetric Analysis (TGA), Differential Scanning Calorimetry (DSC), Nuclear Magnetic Resonance Spectroscopy (NMR), X-Ray Diffraction Spectroscopy (XRD), adsorption, Atomic Force Microscopy (AFM) experiments	KU Leuven
Microscopy images	.tif	100 - 300 GB	Electron Microscopy (EM) and AFM images of absorbant layers	KU Leuven
Structured adsorbant performance	.xlsx	15 GB	Obtained from volumetric and gravimetric analysis methods	VUB
CFD model simulations	.m	5 GB	Simulation data of flow, diffusion and adsorption in structured adsorbants generated by a CFD model	VUB
High-throughput screening	.xlsx	15 GB	OD-measurements and flow cytometry data	UGent
Techno-economical evaluation data	.apw and .xlsx	15 GB	Comparison data generated with AspenTech software	UGent/Inagro

3. Legal and ethical issues

Will you use personal data? If so, shortly describe the kind of personal data you will use. Add the reference to your file in KU Leuven's Register of Data Processing for Research and Public Service Purposes (PRET application). Be aware that registering the fact that you process personal data is a legal obligation.

Privacy Registry Reference:

Short description of the kind of personal data that will be used:

Are there any ethical issues concerning the creation and/or use of the data (e.g. experiments on humans or animals, dual use)? If so, add the reference to the formal approval by the relevant ethical review committee(s)

- No

Does your work possibly result in research data with potential for tech transfer and valorisation? Will IP restrictions be claimed for the data you created? If so, for what data and which restrictions will be asserted?

- Yes

If promising and inventive technologies are developed, IP will first be claimed. After the IP has been taken, the data will be made available via patents.

Do existing 3rd party agreements restrict dissemination or exploitation of the data you (re)use? If so, to what data do they relate and what restrictions are in place?

- No

4. Documentation and metadata

What documentation will be provided to enable reuse of the data collected/generated in this project?

1. Lab notebooks will be numbered and an index will be provided, critical data to replicate experiments will be transferred to either .docx or .xlsx format.
2. .xlsx, .m, .docx, .pdf, .csv files will be organized in folders and subfolders to generate a clear and easy-to-use data library
3. For microscopy and other physicochemical material characterization technique images the following information will be noted: dimensions, image type, bit-depth, pixel sizes and microscope settings

Will a metadata standard be used? If so, describe in detail which standard will be used. If no, state in detail which metadata will be created to make the data easy/easier to find and reuse.

- No

Typically, metadata on physicochemical material characterization technique images will be obtained.

5. Data storage and backup during the FWO project

Where will the data be stored?

1. Physical lab notes and experimental data will be stored on my KU Leuven laptop. Data essential for the replication of experiments will be saved in .xlsx and other file formats together with the experimental data.
2. Data description will be stored in the host institutes secure environment that automatically makes back ups on a regular basis (Box, Dropbox, OneDrive, the internal servers of KU Leuven, etc)
3. OneDrive shared folders will be used for data sharing between collaborators

How is backup of the data provided?

The cloud service KU Leuven Enterprise Box and KU Leuven OneDrive offers automatic back up. Previous versions and deleted data are stored on the Box servers for 30 days. Moreover, the servers at the host institutes are automatically back up'ed on a regular basis.

Is there currently sufficient storage & backup capacity during the project? If yes, specify concisely. If no or insufficient storage or backup capacities are available then explain how this will be taken care of.

- Yes

Currently there is sufficient storage & backup capacity. Currently all reports are stored at Box and OneDrive. Unpublished data of the researchers is stored on the servers and cloud services

provided by KU Leuven.

What are the expected costs for data storage and back up during the project? How will these costs be covered?

The cost of storing the unpublished data on the servers or cloud services is covered by KU Leuven

Data security: how will you ensure that the data are securely stored and not accessed or modified by unauthorized persons?

The data will be stored on the servers or cloud services available at KU Leuven. The data can only be accessed by myself and my supervisor since access is restricted with a username and password. In the case of OneDrive, the data are encrypted: the data transfer to the online software goes via a secured HTTPS connection and is encrypted with a 256-bit SSL.

6. Data preservation after the FWO project

Which data will be retained for the expected 5 year period after the end of the project? In case only a selection of the data can/will be preserved, clearly state the reasons for this (legal or contractual restrictions, physical preservation issues, ...).

After the end of the project, all data will be stored on the servers of the host institute for at least 5 years.

Where will the data be archived (= stored for the longer term)?

The data will be stored on the university's central servers (with automatic back-up procedures) for at least 10 years, conform the KU Leuven RDM policy.

What are the expected costs for data preservation during the retention period of 5 years? How will the costs be covered?

The cost for data preservation of 5 years is estimated to be 500 EUR. These costs are covered by the bench fee provided by FWO.

7. Data sharing and reuse

Are there any factors restricting or preventing the sharing of (some of) the data (e.g. as defined in an agreement with a 3rd party, legal restrictions)?

- No

Which data will be made available after the end of the project?

The data will be made available through the publication of research findings and presentations at conferences throughout the project and in patents following up on the project.

Where/how will the data be made available for reuse?

- In an Open Access repository
- In a restricted access repository
- Upon request by mail

Depending on the type of publication.

When will the data be made available?

- Upon publication of the research results

Who will be able to access the data and under what conditions?

The datasets will be attached as supplementary information together with the publication of the research results. Therefore, it will be available to anyone for any purpose, provided that they give appropriate credit to the creators.

What are the expected costs for data sharing? How will the costs be covered?

Currently, there are no expected costs for data sharing.

8. Responsibilities

Who will be responsible for data documentation & metadata?

Rhea Verbeke

Who will be responsible for data storage & back up during the project?

Rhea Verbeke

Who will be responsible for ensuring data preservation and reuse ?

Rhea Verbeke

Who bears the end responsibility for updating & implementing this DMP?

The PI bears the end responsibility of updating & implementing this DMP.