UNIQUE OPPORTUNITIES WITH CORRUGATED AND NON-SOLVENT SPRAYED MEMBRANES IN OSMOTIC PROCESSES

A Data Management Plan created using DMPonline.be

Creator: n.n. n.n.

Affiliation: KU Leuven (KUL)

Funder: Fonds voor Wetenschappelijk Onderzoek - Research Foundation Flanders (FWO)

Template: FWO DMP (Flemish Standard DMP)

Principal Investigator: Ivo Vankelecom

Data Manager: Laurens Rutgeerts

Project Administrator: n.n. n.n.

Grant number / URL: 12B3M24N

ID: 206839

Start date: 01-01-2024

End date: 01-01-2027

Project abstract:

Amid increasing scarcity of raw materials and fluctuating energy prices, the need for clean and sustainable energy sources is quite evident. A significant potential to obtain clean energy exists from mixing water streams with different salt concentrations also called as blue-energy. The global potential, including the more efficient combinations with very high salinity streams as e.g. from salt mines or brines, is estimated at 2.6 TW, representing approximately 20% of the present worldwide energy demand. To harness this osmotic power, pressure retarded osmosis (PRO) technology holds great potential but still faces critical challenges, such as the absence of specifically tailored PRO membranes, availability of suitable draw solutes and their regeneration, and power loss due to fouling. Therefore, this project focuses on bringing high pressure PRO as a competitive energy technology by substantially improving three bottle-neck concerns of osmotic processes i.e. membranes, draw solutes, and application. Patterned membranes with high fluxes, porosities and mechanical strength will be prepared by modified phase inversion and non-solvent spraying. Cost effective draw solutes will be developed that are easily synthesized and regenerated, have minimal reverse diffusion and generate high osmotic pressures. Lastly, unique and specific applications will be evaluated experimentally and economically for their real-world implementation.

Last modified: 26-04-2024

UNIQUE OPPORTUNITIES WITH CORRUGATED AND NON-SOLVENT SPRAYED MEMBRANES IN OSMOTIC PROCESSES

DPIA

DPIA

Have you performed a DPIA for the personal data processing activities for this project?

- No

UNIQUE OPPORTUNITIES WITH CORRUGATED AND NON-SOLVENT SPRAYED MEMBRANES IN OSMOTIC PROCESSES

GDPR

GDPR

Have you registered personal data processing activities for this project?

- No

UNIQUE OPPORTUNITIES WITH CORRUGATED AND NON-SOLVENT SPRAYED MEMBRANES IN OSMOTIC PROCESSES

Application DMP

Questionnaire

Describe the datatypes (surveys, sequences, manuscripts, objects …) the research will collect and/or generate and /or (re)use. (use up to 700 characters)

I will generate new data, no personal data. My data will result from chemical/optical/physical characterization and testing of membranes. Please check "Part 1: Research Data Summary" as part of the DMP.

Specify in which way the following provisions are in place in order to preserve the data during and at least 5 years after the end of the research? Motivate your answer. (use up to 700 characters)

1. Designation of responsible person (If already designated, please fill in his/her name.) Person: Laurens Rutgeerts
2. Storage capacity/repository
    - during the research: One Drive KU Leuven, Archive Drive K
    - after the research: Archive Drive K

What's the reason why you wish to deviate from the principle of preservation of data and of the minimum preservation term of 5 years? (max. 700 characters)

Not applicable

Are there issues concerning research data indicated in the ethics questionnaire of this application form? Which specific security measures do those data require? (use up to 700 characters)

Not applicable

Which other issues related to the data management are relevant to mention? (use up to 700 characters)

Not applicable

UNIQUE OPPORTUNITIES WITH CORRUGATED AND NON-SOLVENT SPRAYED MEMBRANES IN OSMOTIC PROCESSES

FWO DMP (Flemish Standard DMP)

---

1. Research Data Summary

List and describe all datasets or research materials that you plan to generate/collect or reuse during your research project. For each dataset or data type (observational, experimental etc.), provide a short name & description (sufficient for yourself to know what data it is about), indicate whether the data are newly generated/collected or reused, digital or physical, also indicate the type of the data (the kind of content), its technical format (file extension), and an estimate of the upper limit of the volume of the data.

				Only for digital data	Only for digital data	Only for digital data	Only for physical data
Dataset Name	Description	New or reused	Digital or Physical	Digital Data Type	Digital Data format	Digital data volume (MB/GB/TB)	Physical volume
		Please choose from the following options: • Generate New data • Reuse existing data	*Please choose from the following options:* • Digital • Physical	*Please choose from the following options:* • Observational • Experimental • Compiled/aggregated data • Simulation data • Software • Other • NA	*Please choose from the following options:* • .por, .xml, .tab, .csv,.pdf, .txt, .rtf, .dwg, .gml, … • NA	*Please choose from the following options:* • <100MB • <1GB • <100GB • <1TB • <5TB • <10TB • <50TB • >50TB • NA	
Lab book notes	Observations and description of the practical execution of experiments	Generate new data. (May refer back to old data from PhD also)	Physical	Observational and experimental	NA	NA	+/- 3 books
Experimental	Description of the experimental procedures used to execute the experiments (including membrane synthesis parameters, description of the used materials,...)	New	Digital	Experimental	.docx	<1GB	-
Digital drawings	Drawings of 3D printed parts used during the project	Reuse of existing data	Digital	Software	.stl	<100GB	-

Microscopy images	SEM, TEM, AFM and other microscopy images	New	Digital	Experimental	.tiff	<100GB	-
IR spectra	Results of Fourier-transform and Raman infrared spectroscopy experiments	New	Digital	Experimental	.xlsx	<100GB	-
UV-vis	Results of UV-vis spectroscopy	New	Digital	Experimental	.xlsx	<100GB	-
Viscometry	Results of viscosity measurements	New	Digital	Experimental	.xlsx	<100GB	-
Permeability	Water permeability of membranes	New	Digital	Experimental	.xlsx	<1GB	-
Retentions	Salt (or other solute) retentions of membranes	New	Digital	Experimental	.xlsx	<1GB	-
FO/PRO fluxes	Water fluxes of membranes in forward/pressure retarded osmosis mode	New	Digital	Experimental	.xlsx	<1GB	-
Computational Fluid dynamics	CFD simulations of flow behaviour in cross-flow modes	New and existing	Digital	Experimental and Simulation data	.mph	<100GB	-

If you reuse existing data, please specify the source, preferably by using a persistent identifier (e.g. DOI, Handle, URL etc.) per dataset or data type:

Previous data in the form of manuscripts from PhD projects:
Ayesha Ilyas@Google Scholar

Are there any ethical issues concerning the creation and/or use of the data (e.g. experiments on humans or animals, dual use)? Describe these issues in the comment section. Please refer to specific datasets or data types when appropriate.

- No

Will you process personal data? If so, briefly describe the kind of personal data you will use in the comment section. Please refer to specific datasets or data types when appropriate.

- No

Does your work have potential for commercial valorization (e.g. tech transfer, for example spin-offs, commercial exploitation, …)? If so,

please comment per dataset or data type where appropriate.

- Yes

New membrane synthesis conditions or membrane process could prove valuable to patent for the desired application. Here, the protocols for preparing these membranes and using them for specific application will be patented before sharing the data.

Do existing 3rd party agreements restrict exploitation or dissemination of the data you (re)use (e.g. Material/Data transfer agreements/ research collaboration agreements)? If so, please explain in the comment section to what data they relate and what restrictions are in place.

- No

Are there any other legal issues, such as intellectual property rights and ownership, to be managed related to the data you (re)use? If so, please explain in the comment section to what data they relate and which restrictions will be asserted.

- No

2. Documentation and Metadata

Clearly describe what approach will be followed to capture the accompanying information necessary to keep data understandable and usable, for yourself and others, now and in the future (e.g., in terms of documentation levels and types required, procedures used, Electronic Lab Notebooks, README.txt files, Codebook.tsv etc. where this information is recorded).

Data is linked to experimental sections (word files), which describe how the data is generated and processed. These files are linked to the corresponding data files via an index file (excel file).

Will a metadata standard be used to make it easier to find and reuse the data? If so, please specify (where appropriate per dataset or data type) which metadata standard will be used. If not, please specify (where appropriate per dataset or data type) which metadata will be created to make the data easier to find and reuse.

- No

An excel file will be provided, which links each data file to the purpose, the experiment which generated it and the place where it is stored.

3. Data storage & back-up during the research project

Where will the data be stored?

OneDrive (KU Leuven), Large Volume storage (every 3 months, a backup is made of the onedrive)
All project data will always be saved in (Shared) OneDrive folders.
These folders will be backed-up every 3 months on the Archive drive K

How will the data be backed up?

The back-ups are organized internally in the research group for all data.

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

How will you ensure that the data are securely stored and not accessed or modified by unauthorized persons?

The lab notes and work laptop are stored in a locked cupboard in the researcher's office. The office is located in a badge-restricted area of the building, and is locked if no one is inside.
The laptop is secured with a password and access to double authentication is required to access the KUL One Drive system from other devices.
No very sensitive data will be generated, therefore no extra security (encryption of the computer) is foreseen at this stage.

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

The internal storage costs are estimated to be 50 euro per TB for backup on the internal severs. OneDrive is provided by KU Leuven for free.

4. Data preservation after the end of the research project

Which data will be retained for at least five years (or longer, in agreement with other retention policies that are applicable) after the end of the project? In case some data cannot be preserved, clearly state the reasons for this (e.g. legal or contractual restrictions, storage/budget issues, institutional policies...).

All data will be preserved for 10 years according to KU Leuven RDM policy

Where will these data be archived (stored and curated for the long-term)?

Large Volume Storage (Archive drive K)

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

The costs for long term data storage are 50 euro per TB per year.

5. Data sharing and reuse

Will the data (or part of the data) be made available for reuse after/during the project? In the comment section please explain per dataset or data type which data will be made available.

- Yes, in a restricted access repository (after approval, institutional access only, …)

If access is restricted, please specify who will be able to access the data and under what conditions.

All researchers and PI will have access at all time to the data. Externals can get access to the data upon approval of the PI.

Are there any factors that restrict or prevent the sharing of (some of) the data (e.g. as defined in an agreement with a 3rd party, legal restrictions)? Please explain in the comment section per dataset or data type where appropriate.

- No

Where will the data be made available? If already known, please provide a repository per dataset or data type.

KU Leuven RDR (Research Data Repository)

When will the data be made available?

Upon publication of results

Which data usage licenses are you going to provide? If none, please explain why.

Data Transfer Agreement (restricted data)

Do you intend to add a PID/DOI/accession number to your dataset(s)? If already available, you have the option to provide it in the comment section.

- No

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

KU Leuven RDR free for 50 GB, this should cover the total amount of data generated during this project.

6. Responsibilities

Who will manage data documentation and metadata during the research project?

Ayesha Ilyas

Who will manage data storage and backup during the research project?

Laurens Rutgeerts

Who will manage data preservation and sharing?

Laurens Rutgeerts, Annelies Vanvlasselaer

Who will update and implement this DMP?

Laurens Rutgeerts