Alternative for PEM technology with non-Fluorinated, integrated membranes and PGM-free nanoarchitecture electrodes

VLAIO 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, .cvs,.pdf, .txt, .rtf, .dwg, .gml, … • NA	*Please choose from the following options:* • <100MB • <1GB • <100GB • <1TB • <5TB • <10TB • <50TB • >50TB • NA	
Lab notes	Description of the practical execution of experiments	New	Physical and Digital	Experimental	.xlsx, .docx, .ppt	<100GB	3-6 note books
Membrane characterization	FTIR, PALS, ERD, porometry, microscopy, contact angle, PEIS, uptake, DSC,TGA, NMR, Traction, Ageing (electrolyte, Temp. Fenton's reagent), solid/liquid extraction, H2 crossover, performance analysis in electrolyzer	New	Digital	Experimental	. xlsx, .docx, .txt, .tiff , .avi, .jpeg, .pdf	<1TB	N.A.
Electrode characterization	X-ray reflectivity, spectroscopic ellipsometry, X-ray diffraction, X-ray photoelectron spectroscopy, infrared spectroscopy, electron microscopy, electrochemical impedance spectroscopy, cyclic voltammetry, linear sweep voltammetry	New	Digital	Experimental	.xlsx, .txt, .tiff , .vms, .jpeg, .pdf	<1TB	N.A.

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:

N.A.

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

Some data generated during the project might have potential for tech transfer and valorization. All partners have a legal unit which can provide advise on how to protect the data in the best possible way without compromising scientific communication. Each partner will retain ownership of its own intellectual properties.

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).

KU Leuven: The data files will be named using a standardized naming system, including date of the experiment, name of the researcher, sample code,... The used codes will correspond to the codes used in the lab notebooks. An index or table of content file will be provided with the explanation of each code and a short description of each related project. In this index, also a link will be embedded to the data file location.
UGent: The folder and filename structure will include the name of the researcher, date of the experiment and sample code. The

sample code will be linked to documented deposition conditions in the lab notebooks, with enough details such that the samples can be reproduced in the future if needed. The setups and procedures for the physicochemical and electrochemical characterization will be documented as well. The data analysis will be stored in individual folders and a readme file describing the procedure will be included.
Imec: The data files will be named using a standardized system.

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

KU Leuven, UGent and Imec: All data will be linked to the experimental procedures, how they were generated, and to the methods, how they were processed.

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

Where will the data be stored?

KU Leuven: OneDrive and on the dedicated SharePoint site for this project.
UGent: OneDrive, instrumentation PCs (with backup), dedicated SharePoint site for this project.
Imec: oneDrive and dedicated project sharepoint sites.

How will the data be backed up?

KU Leuven: Via OneDrive. Additional backup on KU Leuven servers every 4 months.
UGent: Daily automated back-ups of local data stored on instrumentation PCs are executed to a remote protected server with online backup hosted by the IT support of UGent (DICT). The local data on personal PCs of the involved researchers will be backed up to a 1TB OneDrive storage space during the research. At the end of the research project, these data are transferred and stored on the aforementioned remote server hosted by DICT.
Imec: via imec backup servers.

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

Storage capacity can be extended upon request. The ICT departments of the institutes arrange regular automatic back-ups of several types.

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

KU Leuven/UGent/Imec: Data stored on OneDrive, SharePoint and the internal KU Leuven / UGent drives are only accessible through a 2-step authentication protocol (password and authenticator), and only authorized persons will be granted access.

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

KU Leuven: OneDrive and SharePoint are free of charge. The internal KU Leuven servers cost 50 euro per Tb per year. These costs are covered by the research group.

UGent: It is not expected that storage and backups create extra costs. In the case new storage elements will be required, they will be covered by the running projects at that moment.
Imec: No extra costs expected.

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...).

KU Leuven: 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)?

KU Leuven / UGent/Imec: On internal KU Leuven / UGent servers for large volume data storage

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

KU Leuven: The costs for long term data storage are 50 euro per TB per year. These are covered by the research group.

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.

- Yes, Intellectual Property Rights

Only data with potential IP protection will be restricted to the consortium members and will not be published before filing a patent.

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

KU Leuven: Scientific publications (open access if possible) or patents, dedicated repositories (RDR (Research Data Repository)), non-published data will remain only accessible by dedicated staff from respective institutes.

When will the data be made available?

Upon publication of research results

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

CC-BY 4.0 (data)
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

6. Responsibilities

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

David Vidal, Maarten Cools, Chiari Van Cauter, researchers from UGent/Imec will maintain the data documentation and metadata of catalyst/electrode preparation and characterization

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

Laurens Rutgeerts

Who will manage data preservation and sharing?

Laurens Rutgeerts, Annelies Vanvlasselaer, Ivo Vankelecom

Who will update and implement this DMP?

Laurens Rutgeerts

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GDPR

GDPR

Have you registered personal data processing activities for this project?

- Not applicable

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DPIA

DPIA

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

- Not applicable