Cathodic deposition of higly connected MOF films

A Data Management Plan created using DMPonline.be

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Project abstract:

Cathodic deposition is an emerging technique for preparing metal-organic framework (MOF) films, which is straightforward, fast, and allows the deposition of MOF films with controlled morphology. However, the cathodic deposition of highly-connected MOF films that possess good chemical stability remains challenging because of the harsh conditions required for the nucleation of the MOF crystals. The main objective of this project is to provide a strategy that enables the one-step cathodic deposition of highly-connected MOF films by accelerating the deprotonation of organic linkers and generating metal clusters in the deposition bath (which are the key to the highly-connected MOF crystal formation). Also, control of the morphology of the deposited MOF films and its underlying mechanism will be explored. As a proof-of-concept of the cathodically deposited highly-connected MOF film, anode-free lithium-ion batteries with it as an artificial solid-electrolyte-interface (SEI) will be fabricated. The functionality of the MOF film-based artificial SEI will be explored.

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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.

Dataset name / ID	Description	New or reuse	Digital or Physical data	Data Type	File format	Data volume	Physical volume
		Indicate: N(ew data) or E(xisting data)	Indicate: **D**(igital) or **P**(hysical)	Indicate: **A**udiovisual **I**mages **S**ound **N**umerical **T**extual **M**odel **SO**ftware Other (specify)		Indicate: <1GB <100GB <1TB <5TB >5TB NA	
Electrochemical analysis data	The electrochemical analysis data are obtained from an electrochemical workstation using electrochemical analysis techniques, e.g., cyclic voltammetry, impedance spectroscopy, chronoamperometry...	N	D	N	txt	<1 GB	
Material characterizations_1	SEM, TEM, AFM images	N	D	I	tif	<100 GB	
Material characterizations_2	FTIR, Raman, UV-vis, ICP, XRD...	N	D	N	.txt, .xlsx	<100 GB	
Physical samples_1	thin films	N	P	monoliths			>50 dm^3
Physical samples_2	batteries	N	P	monoliths			>10 dm^3

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)? If so, refer to specific datasets or data types when appropriate and provide the relevant ethical approval number.

- No

Will you process personal data? If so, please refer to specific datasets or data types when appropriate and provide the KU Leuven or UZ Leuven privacy register number (G or S number).

- 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.

- No

Do existing 3rd party agreements restrict exploitation or dissemination of the data you (re)use (e.g. Material or 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

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).

All digital data are created by the used instruments automatically. The used conditions are recorded as well. For material characterizations and electrochemical tests, we will also record the detailed test parameters in notebooks which will be stored in our lab.
All physical samples will be stored in the lab which are available to everyone with permission from us.

Will a metadata standard be used to make it easier to find and reuse the data?
If so, please specify which metadata standard will be used.

If not, please specify which metadata will be created to make the data easier to find and reuse.

- No

Data Storage & Back-up during the Research Project

Where will the data be stored?

- OneDrive (KU Leuven)
- Large Volume Storage

How will the data be backed up?

- Personal back-ups I make (specify below)
- Standard back-up provided by KU Leuven ICTS for my storage solution

Is there currently sufficient storage & backup capacity during the project?

If no or insufficient storage or backup capacities are available, 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?

All the initial digital data will be stored in the lab computers. Only the authorized person has access to the labs. Also, only the authorized person has the code to start the lab computers.

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

All the costs for data storage are covered by the Department of Materials Engineering.

Data Preservation after the end of the Research Project

Which data will be retained for 10 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

The physical samples may be not able to be preserved for 10 years since their poor chemical stability in the air.

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

- Large Volume Storage (longterm for large volumes)

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

The estimate costs for data preservation during the expected retention period is 200 euros which can be covered by the department or a research project.

Data Sharing and Reuse

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

- Yes, as restricted data (upon approval, or institutional access only)

All digital data are accessible with permission from us or the university.
The physical samples are available for everyone after finishing the project.

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

All digital data are accessible with permission from us or the university.
The physical samples are available for everyone after finishing the project.

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 per dataset or data type where appropriate.

- Yes, intellectual property rights

All data will not be accessible to the public until they get published. We will share the data with our collaborators or anyone who has our permission.

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 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 persistent identifier (PID) to your dataset(s), e.g. a DOI or accession number? If already available, please provide it here.

- No

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

The cost for data sharing could be very low.

Responsibilities

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

Myself (Sijie Xie) and my supervisor (Jan Fransaer)

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

Myself (Sijie Xie) and my supervisor (Jan Fransaer)

Who will manage data preservation and sharing?

Myself (Sijie Xie) and my supervisor (Jan Fransaer)

Who will update and implement this DMP?

Myself (Sijie Xie)

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6 of 6