



Sustainable manufacturing and optimized materials and interfaces for lithium metal batteries with digital quality control

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D8.3: Ethics plan

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Abstract

This report describes how the SOLiD consortium will handle the ethics issues, which were identified in the ethics self-assessment. The ethics self-assessment was written in the proposal phase and updated in the Grant Agreement preparation phase. The main ethics issue relevant for the SOLiD project is to ensure safety during the development and testing of the novel solid state battery materials, processes, and devices. Another ethics issue was related to the importing of materials from non-EU countries. Artificial intelligence (AI) methods are used in the project, but no ethics issues related to human rights were identified for those, as we do not handle personal data by AI.



Publishable Summary

The SOLiD consortium has prepared an Ethics Plan to handle all ethics issues, which have been identified in the ethics self-assessment, prepared by the consortium, and reviewed by the European Commission. The main ethics issue in the project is to ensure safety during the development and testing of the novel materials and processing methods for the solid-state batteries, which are developed in the project. When ready, the SOLiD batteries are safer than conventional Li-ion batteries. Thus, the safety issues are mainly related to the development and production phase.

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Deliverable content

Introduction and general ethics plan

This report gives an overview on the ethics plan of the SOLiD project. The SOLiD project does not contain any significant ethics issues or risks. Thus, the project activities can't be qualified as serious or complex from an ethics perspective. However, the following issues were identified in the ethics self-assessment:

- Safety
- Import from non-EU countries
- Artificial intelligence
- Handling of personal data

The ethics topics will be discussed and followed throughout the project duration. They will be a topic in the General Assembly meetings, monthly meetings, and work package (WP) meetings, when relevant. Ethics issues are also included in the risk assessment, which was prepared during the proposal phase, updated during the Grant Agreement phase, and followed and updated regularly as a living document in the project MS Teams platform.

To support the ethics planning, VTT as coordinator will propose an external and independent expert to act as Ethics Advisor (EAd). The EAd will monitor the ethics issues involved in the project and how they are handled. The EAd will attend project meetings when necessary and will be consulted on all ethical issues.

Safety

Regarding safety, the SOLiD cells will be safer than the conventional Li-ion batteries, due to the solid and non-flammable electrolyte. Thus, we do not see any potential safety issues for the consumer or end user. However, when handling e.g., Li metal during the production, or when performing e.g., safety tests for the batteries, safety issues need to be carefully considered.

For example, Pulsedion as the Li film producer has stated that working alone is not allowed. In addition, we will pay extra attention to risk assessment for the materials and processing. In addition, Ocsial produces a nanomaterial that falls under REACH regulation. There are safety rules when it comes to the handling of such materials: <https://tuball.com/pages/health-safety>.

As another example, Specific Polymers will produce polymeric materials for solid-state electrolytes and thus is directly concerned by safety matters. Being a R&D company specialized in the synthesis of specialty (macro)molecules, SP is used to handling chemicals in a safe manner and has listed safety rules in an internal document. For example, laboratory staff must wear personal protective equipment (gloves, glasses, mask...), and working alone is forbidden. All experiments are performed under a fume hood. Material Safety Data Sheet (MSDS) for each chemical product stored and handled in the facility are electronically recorded and accessible to all personnel. For the development of synthesis processes, special attention is given to the replacement of toxic compounds by safer ones, whenever possible. All products synthesized by SP are shipped with their Technical Data Sheet (TDS) and MSDS.



The products are packaged in appropriate containers and identified with labels indicating the product reference and storage conditions.

We have a dedicated deliverable for the risk assessment, and we have included an ethics task in WP8 “Project Management and Coordination” where we will follow that all safety guidelines are first made (if not yet existing), and then followed during the project. Risks will be followed also in the WP, monthly, and General Assembly meetings.

All consortium members who are doing experimental work, will provide safety guidelines for the SOLiD project. These will cover the safety instructions for workers in the own partner facilities, as well as safety guidelines to other partners who will use and/or handle materials and/or cells that will be shipped for further processing or analysis. In addition, guidelines for safe shipping of samples will be prepared. This will ensure also maintaining high quality of the shipped samples. All guidelines will be stored in the SOLiD MS Teams platform.

[Import from and export to non-EU countries](#)

The original plan in the proposal phase was that some materials will be imported from non-EU countries (Switzerland and Russia) to EU countries for testing purposes, and materials will be exported from EU countries to Switzerland for cell assembly. Due to the current situation and sanctions, importing from Russia is not anymore planned. The material, which was supposed to be imported from Russia, is the carbon nanotube (CNT) by Ocsial. Ocsial has production facilities also in other locations than Russia. Thus, we can use those production sites for the CNT material.

Some reference materials (polycarbonates) are imported from USA. Importing materials and/or battery cells from Switzerland or USA to EU is not considered to be an ethical issue.

Details on the materials which will be imported to/exported from the EU will be provided in the periodic reports. In addition, the situation related to Russia is followed actively and plans regarding the CNT production will be modified if needed, according to the EU guidelines.

[Artificial intelligence](#)

Regarding artificial intelligence (AI), the data in SOLiD is not linked with humans, i.e., no personal data will be handled by AI. Thus, we do not see any risks regarding human rights. However, there is always a risk of mistakes when data is interpreted. Thus, we will have critical evaluation of the AI based results, to not endanger the project objectives regarding yield and digital quality control.

However, should data collected and shared via cloud e-platforms, particularly that which contains confidential and personal information fall into the wrong hand, this can be misused. Risk assessment and details on measures to prevent misuse of research findings will be provided in the periodic reports.

[Handling of personal data](#)

The project may collect and process personal data during the communication and dissemination activities (e.g., via website, social media such as LinkedIn, Twitter, Facebook, brochures, press releases, conferences, newsletters, workshops, etc.). In this context, regardless of the approach or channel being used for personal data collection and processing (online or offline), the beneficiaries will prepare



and communicate the GDPR compliant privacy (and cookie where applicable) policy to the data subjects.

Schedule

The schedule for the planned actions is the following:

- Potential candidates for the Ethics Advisor will be identified during 2022 (together with the whole consortium), and VTT as the coordinator will contact the selected candidate in January 2023. The target is to have the Ethics Advisor selected and agreements signed before the end of February 2023.
- All SOLiD partners who are doing experimental work will provide safety guidelines related to their project tasks until the end of February 2023.
- Ethics risks will be followed continuously during the project, as part of the general risk assessment. VTT as the coordinator and WP8 leader will make sure that the ethics risks are discussed in the relevant meetings, and when necessary.