DATA MANAGEMENT PLAN

# 1. Data description and collection or re-use of existing data

## How will new data be collected or produced and/or how will existing data be re-used?

The data will be produced during the realization of the project (already existing data will not be used). The production

of data will be performed by scientists involved in the project realization during samples preparation and

measurements. It will consist of laboratory notes and datasets recorded during experiments. The type of data will vary

depending on the type of experiment (mainly numeric data in a form of columns and graphs). Owned devices are

equipped with dedicated software.

All measuring devices are periodically calibrated or checked using calibration samples.

The data source can be read from the saved files extension (e.g. \*.ocw- voltammetry curves recorded using GPES

software using Autolab potentiostat, \*spc - Raman spectra recorded using Micro-Raman Renishaw InVia spectrometer).

Attention will be paid to the correct and unambiguous naming of files (including sample name, date of production, type

and conditions of measurement).

[w języku angielskim]

## What data (for example the types, formats, and volumes) will be collected or produced?

As a result of the project realization, physical samples and experimental data will be produced. It is estimated that the

total volume of data will be in a range of 25-500 GB. Depending on the measurement device and used software,

different format of the files will be produced, e.g.:

- data from electrochemical measurements recorded using autolab system (\*.oxw, \*.ocw),

- data from electrochemical measurements recorded using biologic system (\*.mp\*),

- data from Raman spectrometer (\*.spc),

- data from scanning electron microscope (\*.tiff, \*.jpeg),

- data containing XRD patterns, impedance spectra require appropriate software to read the data, thus data will be

converted to readable \*.csv format.

# 2. Documentation and data quality

## What metadata and documentation (for example methodology or data collection and way of organising data) will accompany data?

The data will be produced using measurement and experimental procedures established during the project

implementation. The standardized naming of files and catalogues will enable finding and reading the searched data.

The part of the produced data will be facilitated by the open research data repository system The Bridge of Data (MOST

danych) with metadata standards. Metadata description will be stored in JSON-LD format. The principle investigator of

the project will be identified and authorized using ORCID.

## What data quality control measures will be used?

In order to ensure the high quality of the obtained data, the measuring devices will be periodically calibrated (e.g. pH

meter, Raman spectrometer) or checked using calibration samples (e.g. potentiostat). In the case of electrochemical

impedance spectroscopy measurements, the Kramers-Kronig test will be performed each time. The light intensity of

solar simulator will be control using the power meter.

The data will be catalogued in a standardized way fulfilling the requirements of FAIR standards. The data available in an

open repository will have DOI assigned and the data will be positioned in the way to ensure its accessibility.

# 3. Storage and backup during the research process

## How will data and metadata be stored and backed up during the research process?

The volume of produced data will not exceed the storage volume of standard hard drives. The data will be stored on

the computers connected to the devices. Additionally, the data will be copied to computers used by the personnel

involved in the project implementation in order to process the data. The developed data will be exchanged between

the personnel involved in the project implementation using USB memory sticks. All computers will be protected by

periodically changed passwords.

Once a quarter all data will be copied to an external hard drive used for data storage, stored in a locked cabinet. The

principal investigator will be responsible for backing up data to an external disk. The part of data will be stored using

data repository - the bridge of data.Dominika Parasińska, Politechnika Gdańska 650474

## How will data security and protection of sensitive data be taken care of during the research?

No special data protection is planned. There is no such need because it is not sensitive data. The data will be accessible

for trained persons using measuring devices connected to computers used to carry out the project's tasks. The data will

be stored on the hard disks of computers connected to the devices, on the computers of people working in the project,

partly on USB sticks, partly in the data bridge repository, and on an external disk. The risk of all data being lost is

extremely low.

# 4. Legal requirements, codes of conduct

## If personal data are processed, how will compliance with legislation on personal data and on data security be ensured?

Nie dotyczy

## How will other legal issues, such as intelectual property rights and ownership, be managed? What legislation is applicable?

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The ownership and management of any intellectual property developed in collaboration relating to the project remain

of the Gdansk University of Technology. The data and results published in open-access will have one of the Creative

Commons licences.

# 5. Data sharing and long-term preservation

## How and when will data be shared? Are there possible restrictions to data sharing or embargo reasons?

The part of the produced data will be published by the open research data repository - the Bridge of Data (MOST

Danych) provided by Gdansk University of Technology. Some data may be published in journals requiring the sharing of

raw data. The data will be stored for a minimum of 10 years, in accordance with NCN guidelines

## How will data for preservation be selected, and where will data be preserved long-term (for example a data repository or archive)?

The main data repository will be the Bridge of Data. The choice of data will be based on their quality. In the case of e.g.

incorrectly performed experiments, no data transfer to the repository is planned. The repository will mainly contain the

data that will be the basis for publication. The data provided in the Bridge of Data fulfil FAIR requirements and will be

properly categorized and labeled according to the standard file formats.

## What methods or software tools will be needed to access and use the data?

Most of the data will be available in a format that does not require specialized reading software. (e.g. \* .csv, \* .tiff).

Data obtained from electrochemical measurements using an autolab device (e.g. \* .ocw) can also be read by generally

available software. In the case of the data requiring dedicated software, the files can be converted to readable format

on a direct request.

## How will the application of a unique and persistent identifier (such us a Digital Object Identifier (DOI)) to each data set be ensured?

The datasets transferred to the repository will have the DOI assigned.

# 6. Data management responsibilities and resources

## Who (for example role, position, and institution) will be responsible for data management (i.e the data steward)?

Open Science Competence Center (pg.edu.pl/openscience) - established by GUT will be responsible for DMP and data

storage and dissemination. The principle investigator - Konrad Trzciński will be responsible for the development of the

measurements procedures, appropriate cataloguing of data and overall data quality.

## What resources (for example financial and time) will be dedicated to data management and ensuring the data will be FAIR (Findable, Accessible, Interoperable, Re-usable)?

Nie dotyczyDominika Parasińska, Politechnika Gdańska 650474