



TECHNISCHE
UNIVERSITÄT
WIEN

Data management plan (DMP)

Photoenzymatic Additive Manufacturing – 1000 Ideas

ELSA

Version	Effective date	Description of document/changes
1.0	06/07/2025	First version of the DMP – created for the start of the project

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This document is based, with minor changes, on the [RDM Guidance for Researchers](#) of Science Europe.

I General Information							
I.1 Administrative information	PI: Katharina Ehrmann (0000-0002-0161-0527 - ORCID) , katharina.ehrmann@tuwien.ac.at, TU Wien FWF grant information: Austrian Science Fund (FWF), 1000 Ideas Program (Grant DOI: 10.55776/TAI1267025) DMP version: 1.0, 06.07.2025 Contributors: Katharina Ehrmann, katharina.ehrmann@tuwien.ac.at, TU Wien, Data Manager						
	I.2 Data management responsibilities and resources Person responsible for data management and DMP: Katharina Ehrmann, katharina.ehrmann@tuwien.ac.at, TU Wien Co-ordination of data management responsibilities across partners: Resources costed in for RDM: There are no costs dedicated to data management and ensuring that data will be FAIR.						
II Data Characteristics							
II.1 Data description and collection or re-use of existing data	Produced datasets:						
	dataset ID	title	type	format	estimated volume	contains sensitive data	description
	P1	Thermomechanical material characterization	Standard office documents	.xls	5 - 20 GB	no	(Thermo)mechanical testing data from dynamic scanning calorimetry (DSC), dynamic mechanic thermal analysis (DMTA), tensile testing and atomic force spectroscopy (AFM) is reported as raw data imported into .xls spreadsheets. The file names are "thermomechanical data_compound name 1_compound name x", listing all reported compounds. Tensile tests: y = sigma (%; stress), x = epsilon (MPa; strain). DMTA: x = G' (MPa; storage modulus), G'' (MPa; loss modulus), tan delta (loss factor); y = temperature (°C). AFM topography imaging: x = position on sample X (µm), y = position on sample Y (µm), z = sample topography Z (nm; in graphical displays this value can alternatively be displayed as colour code in 2D images). AFM

						phase imaging: x = position on sample X (μm), y = position on sample Y (μm), z = phase shift (°). AFM force-distance curves for specific points (X Y) on sample surface: x = distance (nm), y = force (nN).
P2	Synthesis and purification protocols	Electronic laboratory notebook; Standard office documents	.docx	1 - 5 GB	no	Synthesis and purification protocols in standard small molecule organic synthesis and polymer synthesis including qualitative (appearance) and quantitative (amount, NMR, LC-MS, HR-MS, Rf-value or RI-value) product description are documented in an electronic laboratory notebook and reported in corresponding text data formats where required to produce the molecules/samples subjected to reported analysis results.
P3	3D printing experiments	Electronic laboratory notebook; Standard office documents, standard image files	.xls .docx .jpg	100 - 1000 MB	no	3D printing experiments are documented in an electronic laboratory notebook including the configuration parameters for the printer (light source specification: wavelength, intensity; illumination duration/scanning speed, hatching distance, peel-off time, vat and platform temperature) and reported in corresponding text data formats where required to produce the printed samples subjected to reported analysis results. Files of the 3D shape printed are saved in stl format, which is routinely utilized for 3D printing.
P4	NMR data	Raw data	free induction decay (fid)	100 - 1000 MB	no	free induction decay (fid) data obtained from nuclear magnetic resonance (NMR) spectroscopy (1H, 13C, potentially other nuclei). The NMR datasets are organized as obtained directly after the measurement, allowing further processing with commonly used software, such as Mnova or TopSpin. The files and folders are named after the original experiment as documented in the laboratory journal.
P5	IR data	Structured text,	.xls	100 - 1000 MB	no	Infrared (IR) spectra obtained from infrared spectroscopy. The IR datasets contain infrared-

			Standard office documents				absorption or -transmission values of specified samples (arbitrary units, y-coordinates) as a function of the wavenumber (in cm^{-1} , x-coordinates) and are exported as .csv files and named after the original experiment as documented in the laboratory journal.
P6	UV/vis data	Structured text, Standard office documents	.xls	100 - 1000 MB	no		Ultraviolet (UV)/visible (vis) light absorption (% , y-coordinates) is reported as a function of wavelength of the incident light (nm, x-coordinates). The datasets are exported as .csv files and organized as obtained directly after the measurement. They are named after the original experiment as documented in the laboratory journal.
P7	LC-MS data	Structured text, Standard office documents	.xls	100 - 1000 MB	no		The elugram (y = detector signal, x = elution time) and mass/charge (m/z) ratio of all eluted fractions is summarized in an xml file. The files are named after the original experiment as documented in the laboratory journal.
P8	Polymer photocuring process characterization	Standard office documents	.xls	100 - 1000 MB	no		The polymer photocuring process is characterized by photorheology and photodynamic scanning calorimetry (DSC), the data of which is reported in an Excel spreadsheet. The following parameters are recorded during photorheology: y = G' (storage modulus; MPa), G'' (loss modulus; MPa), and F_N (normal force; N); x = time (s). The following parameters are recorded during photo-DSC: y = reaction enthalpy ΔH ($\text{mW} \cdot \text{g}^{-1}$), x = time (s).
P9	SEC	Standard office documents	.xls	100 - 1000 MB	no		Size exclusion chromatography (SEC) data consisting of elution volume (in mL; x-axis) and detector response (light scattering; refractive index; UV/vis; in arbitrary units; y-axis). Samples are prepared by filtering 1-2 mg mL^{-1} concentrated samples in tetrahydrofuran (THF) spiked with 100 ppm butylhydroxytoluene (BHT= through a syringe filter into the SEC vial. Detection can be conducted with only one

							detector (single detection) in combination with external calibration via polystyrene standards (standard calibration) or with triple detection allowing determination of the change in refractive index with concentration (dn/dc) by measuring five different injection volumes of the sample.
	P10	Enzymatic activity assays	Electronic laboratory notebook; Standard office documents, standard image files	.xls .docx .jpg	100 - 1000 MB	no	Enzymatic activity tests are documented in an electronic laboratory notebook including the parameters enzyme type, form (native, immobilized) and concentration, solvent type and volume, substrate for enzymatic conversion, and kinetic reaction data obtained from the experiment.
	P11	Degradation testing	Electronic laboratory notebook; Standard office documents, standard image files	.xls .docx .jpg	100 - 1000 MB	no	Degradation experiments are documented in an electronic laboratory notebook including the parameters material type and form (chemical & dimensional parameters (in mm x mm x mm), porosity (e.g. as sample density), weight (in mg)), solvent type and amount, degradation temperature (in °C) and time (in days), initial sample weight (in mg), swelling weight (wet sample directly after degradation, in mg), dry weight (after drying to constant weight upon degradation, in mg).
Methods and software used for data generation and reuse Research data will be generated by the methods specified above, with the instrumentation at the Institute of Applied Synthetic Chemistry and in the Research Group for Polymer Chemistry and Technology. Software to generate the data is correlated to the respective instruments.							
III Documentation and Data Quality							
III.1 Metadata and documentation	Data organisation, metadata, and documentation: The respective work package leader will handle the structure and versioning of the research data. As there are no domain specific metadata standards applicable, we will provide a README file with an explanation of all values and terms used at file, dataset and project level. This will help others to identify, discover, and reuse our data.						

	Additionally, we will provide common metadata such as title, description, or keywords when publishing data in open access repositories. In such a case, we will follow the default template provided by the repository, such as Data Cite Metadata or Dublin Core. As far as possible, we will use controlled vocabularies for our data to allow inter-disciplinary interoperability and machine-actionability. All documentation will be uploaded to TU Wien's designated data repository (https://researchdata.tuwien.ac.at/).								
III.2 Data quality control	Data quality control: The following data quality checks will be done: calibration, repeated samples or measurements, standardised data capture and peer review of data.								
IV Data Storage, Sharing, and Long-Term Preservation									
IV.1 Data storage and backup during the research process	Storage and backup facilities: For the duration of the project, storage and backup of data will be ensured by Katharina Ehrmann (acting as the person responsible for data management and DMP) in cooperation with the responsible representative of TU Wien's Campus IT. External and internal storage options will be used. Details about storage options and the stored datasets can be found in the storage table. P1 (Thermomechanical material characterization), P2 (Synthesis and purification protocols), P3 (3D printing experiments), P4 (NMR data), P5 (IR data), P6 (UV/vis data), P7 (LC-MS data), P8 (Polymer photocuring process characterization), P9 (SEC), P10 (enzymatic activity assays), P11 (degradation tests) will be stored on Backup of TUfiles. External storage will be used because institutional storage is used, backup of tu files is utilized as a redundancy for data safety. P1 (Thermomechanical material characterization), P2 (Synthesis and purification protocols), P3 (3D printing experiments), P4 (NMR data), P5 (IR data), P6 (UV/vis data), P7 (LC-MS data), P8 (Polymer photocuring process characterization), P9 (SEC), P10 (enzymatic activity assays), P11 (degradation tests) will be stored on TUfiles: TUfiles is a central and readily available network drive with daily backups and regular snapshots provided by TU.it. It is suitable for storing data with moderate access requirements, but high availability demands that allows full control of allocating authorisations. Only authorized staff members will have access. Data security and protection of sensitive data: We pay strict attention to compliance with the relevant institutional and national data protection policies. At this stage, it is not foreseen to process any sensitive data in the project. If this changes, advice will be sought from the data protection specialist at TU Wien, and the DMP will be updated. Access to data during research: <table><tr><th>dataset ID</th><th>selected project members</th><th>all other project members</th><th>the public</th></tr><tr><td>P1</td><td>writing</td><td>writing</td><td>no access</td></tr></table>	dataset ID	selected project members	all other project members	the public	P1	writing	writing	no access
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P1	writing	writing	no access						

	P2	writing	writing	no access		
	P3	writing	writing	no access		
	P4	writing	writing	no access		
	P5	writing	writing	no access		
	P6	writing	writing	no access		
	P7	writing	writing	no access		
	P8	writing	writing	no access		
	P9	writing	writing	no access		
	P10	writing	writing	no access		
	P11	writing	writing	no access		
	All incidents will be handled individually by an incident response team that is maintaining the affected service.					
IV.2 Data sharing and long-term preservation	Data publication and access conditions: As far as possible, obtained datasets will be published in repositories. Details on access conditions, reuse licenses, reasons for restrictions, etc. are collected in the table below.					
	dataset ID	access conditions	restrictions / embargo reasons	estimated publication date	location for publication (repository)	PID
	P1	Open		2027-12-30	TU Wien Research Data	DOI
	P2	Open		2027-12-30	TU Wien Research Data	DOI
	P3	Open		2027-12-30	TU Wien Research Data	DOI

	P4	Open		2027-12-30	TU Wien Research Data	DOI	CC-BY-4.0
	P5	Open		2027-12-30	TU Wien Research Data	DOI	CC-BY-4.0
	P6	Open		2027-12-30	TU Wien Research Data	DOI	CC-BY-4.0
	P7	Open		2027-12-30	TU Wien Research Data	DOI	CC-BY-4.0
	P8	Open		2027-12-30	TU Wien Research Data	DOI	CC-BY-4.0
	P9	Open		2027-12-30	TU Wien Research Data	DOI	CC-BY-4.0
	P10	Open		2027-12-30	TU Wien Research Data	DOI	CC-BY-4.0
	P11	Open		2027-12-30	TU Wien Research Data	DOI	CC-BY-4.0
TU Wien Research Data is an institutional repository of TU Wien to enable storing, sharing and publishing of digital objects, in particular research data. It facilitates the funders' requirements for open access to research data and the FAIR principles by making research output findable, accessible, interoperable, and reusable. A DOI is assigned to each dataset published in TU Wien Research Data. This service is developed by the TU Wien Center for Research Data Management and hosted by TU.it. https://researchdata.tuwien.at/ Methods or software needed to access and use data: Most data is accessible with open source software or standard software (microsoft office). Other software is field-specific software but not instrument-specific software: NMR-data (e.g. accessible via MestRe Nova).							

	Long-term preservation and deletion of data:			
	dataset ID	location for long-term storage	minimum retention period (≥ 10 years)	foreseeable research uses and/or users
	P1	TU Wien Research Data	10 years	Members of the scientific community could be interested to reproduce the results during the course of their research. Decision makers in industry could be interested in results due to interest in the new technologies developed. Students could be interested in results due to follow-up projects based on this data or educational reasons.
	P2	TU Wien Research Data	10 years	
	P3	TU Wien Research Data	10 years	
	P4	TU Wien Research Data	10 years	
	P5	TU Wien Research Data	10 years	
	P6	TU Wien Research Data	10 years	
	P7	TU Wien Research Data	10 years	
	P8	TU Wien Research Data	10 years	
	P9	TU Wien Research Data	10 years	
	P10	TU Wien Research Data	10 years	
	P11	TU Wien Research Data	10 years	
V Legal and Ethical Aspects				
V.1 Legal aspects	Personal data: At this stage, it is not foreseen to process any personal data in the project. If this changes, advice will be sought from the data protection specialist at TU Wien, and the DMP will be updated.			

	Intellectual property rights and rights of use: The following individual(s) hold rights and control access to the project data: Dr. Katharina Ehrmann is the owner of the data and controls its access.
V.2 Ethical aspects	Ethical issues: No particular ethical issue is foreseen with the data to be used or produced by the project. This section will be updated if issues arise.