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Developing New 2D Materials and Heterostructures for Printed Digital Devices



2D-PRINTABLE - Deliverable report

D8.3 – Initial Data Management Plan



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Project Scientific Abstract

The 2D-PRINTABLE project aims to integrate sustainable large-scale liquid exfoliation techniques with theoretical modelling to efficiently produce a wide range of new 2D materials (2DMs), including conducting, semiconducting, and insulating nanosheets. The focus includes developing the printing and liquid phase deposition methods required to fabricate networks and multicomponent heterostructures, featuring layer-by-layer assembly of nanometer-thick 2DMs into ordered multilayers. The goal is to optimize these printed networks and heterostructures for digital systems, unlocking new properties and functionalities. The project also seeks to demonstrate various printed digital devices, including proof-of-principle, first-time demonstration of all-printed, all-nanosheet, heterostack light-emitting diodes (LEDs). In conclusion, 2D-PRINTABLE will prove 2D materials to be an indispensable material class in the field of printed electronics, capable of producing far-beyond-state-of-the-art devices that can act as a platform for the next generation of printed digital applications.

Public summary

Over the past two decades, 2D materials (2DMs) have revolutionized materials science and nanoscience, presenting exceptional physical and chemical properties that have enabled groundbreaking advancements in optoelectronics, energy, sensing, and composites. Despite their immense potential, realizing the full technological capabilities of 2DMs on a macroscale level remains a challenge. The 2D-PRINTABLE project seeks to address this challenge by developing sustainable methods for liquid exfoliation of diverse 2DMs into inks that can be printed into macroscale networks, mirroring the properties of individual nanosheets. Guided by machine learning and AI, 2D-PRINTABLE aims to integrate various 2DMs with superior electronic properties into printable heterostructures tailored for digital technologies. This involves incorporating essential elements such as transistors, capacitors, and diodes to create high-performance printed photodetectors, solar cells, light-emitting diodes, inverters, and non-volatile memories. This Data Management Plan (DMP) addresses how 2D-PRINTABLE will meet the FAIR principles by maximising the findability, accessibility, interoperability, and replicability of its data. The DMP clearly outlines what kind of data the project will use and generate, how this data will be stored privately and publicly and what resources are in place to manage, protect and publish data

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Project partners:

#	Partner short name	Partner Full Name
1	TCD	TCD THE PROVOST, FELLOWS, FOUNDATION SCHOLARS & THE OTHER MEMBERS OF BOARD, OF THE COLLEGE OF THE HOLY & UNDIVIDED TRINITY OF QUEEN ELIZABETH NEAR DUBLIN
2	UNISTRA	UNIVERSITE DE STRASBOURG
3	UKa	UNIVERSITAET KASSEL
4	BED	BEDIMENSIONAL SPA
5	TUD	TECHNISCHE UNIVERSITAET DRESDEN
6	VSCHT	VYSOKA SKOLA CHEMICKO-TECHNOLOGICKA V PRAZE
7	UNR	UNIRESEARCH BV
8	UniBw M	UNIVERSITAET DER BUNDESWEHR MUENCHEN
9	EPFL	ECOLE POLYTECHNIQUE FEDERALE DE LAUSANNE

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