

Graphene Flagship

2D-PRINTABLE is part of the Graphene Flagship Initiative, specifically aligned within the "2D materials of tomorrow" focus area.

PARTNERS



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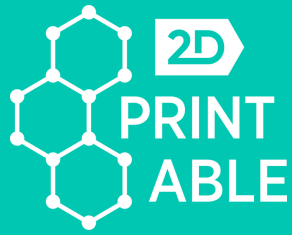


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Funded by
the European Union

Statement: "This project has received funding from the European Union's Horizon Europe research and innovation programme under grant agreement number 101135196"



FACTS & FIGURES

Acronym: 2D-PRINTABLE
Duration: 36 months
Start date: 1st October 2023
Total budget: 4,092,496.25€
EC Funding: 3,999,996.00€

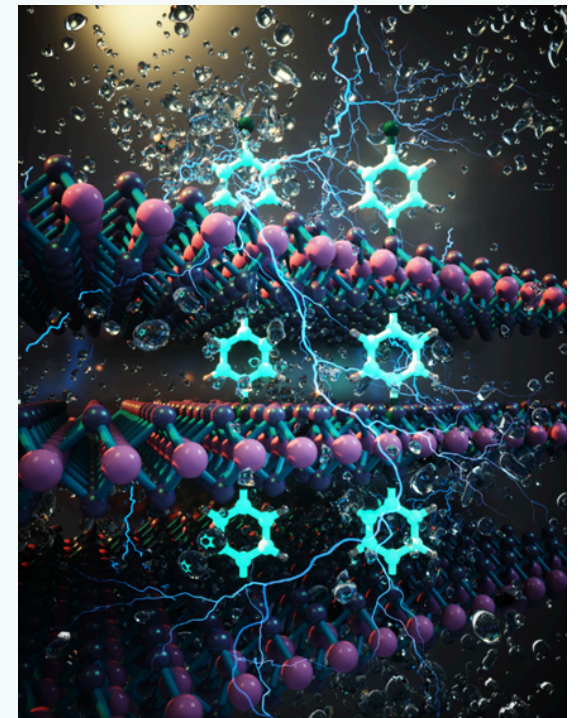


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SCAN ME



Developing New 2D Materials and Heterostructures for Printed Digital Devices using sustainable liquid exfoliation and deposition methods.

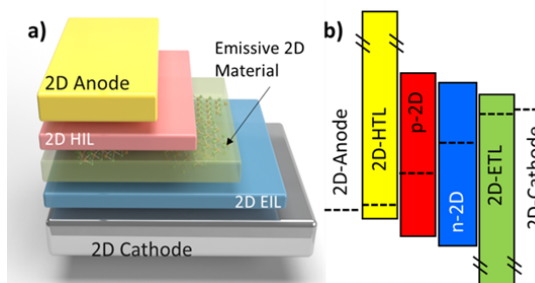
For more information, please contact us at colemaj@tcd.ie.

About 2D-PRINTABLE

2D materials have transformed materials science and nanoscience with their remarkable physical and chemical properties, driving innovations in fields like optoelectronics, energy, and sensing technology. However, to fully realise their technological potential, scalable and cost-effective methods are needed to transfer their exceptional electronic properties to larger samples. The 2D-PRINTABLE project is dedicated to achieving this goal by employing sustainable and affordable techniques known as liquid exfoliation methods. Through the 2D-PRINTABLE project, we will demonstrate that 2D materials are an indispensable asset in the field of printed electronics and have the potential to contribute significantly to addressing some of the world's most pressing global challenges. Novel 2D materials can push the boundaries of current technology and provide a platform for the next generation of printed digital applications.

Concept

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. 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.



Results

Materials: >45 distinct innovative 2DMs: new unreported 2DMs; modified variants of known materials, materials previously unexfoliated, chemically modified/functionalised. New 2DMs available as printable inks, powders & films.

Networks & Heterostructures: New fabrication protocols for innovative printing & solution processing methods.

Breakthrough Devices: 1st all-printed, all nano-sheet LEDs, solar cells, high-performance transistors & memory elements + New fabrication protocols & full performance data.

Novel Characterization Methods: to demonstrate new properties/complementary functionalities of materials, networks, heterostructures, & devices.