Holistic, reliable and practical Characterization Framework for Graphene-Family Materials, a correlated approach including Imaging-based techniques

Daniel Fernandez-Poulussen[1], Damjana Drobne[2]

[1]*IDONIAL, Gijón, Spain.*

[2]*University of Ljubljana, Slovenia*

Daniel.fernandez@idonial.com

ACCORDs is an Horizon Europe project working in the development of an imaging-based characterization framework for the holistic correlative assessment of Graphene Family Materials (GFMs) as a representative of 2D nanomaterials (NMs) to assess and predict 2D NMs health and environmental risks.

The ACCORDs framework will operationalise safe and sustainable by design (SSbD) strategies proposed in past or ongoing H2020 projects or within OECD by **correlating low-, medium-, and high-resolution physico-chemical-biological imaging-based methods with non-imaging methods in a tiered approach**. ACCORDs will deliver the framework and user guidance, new imaging-based characterisation methods, reference in vitro tests, new reference 2D NMs for different matrices, a new minimum information reporting guideline for FAIR data sharing and reuse of images as well as an atlas with reference images for diagnostics of compromised safety of GFMs / GFM products. The new guidelines and standard proposals will be submitted to standardisation bodies to allow creation of regulatory ready products.

The novelty of ACCORDs is in **translating the principles of medical imaging-based diagnostics to 2D material hazard diagnostics**. ACCORDs will accelerate industrial sectors in the area of aviation, marine construction, drone production, flexible electronics, photovoltaics, photocatalytics and print inks-based sensors.

The value ACCORDs proposes to the graphene industry are practical, easy, imaging-based tools for GFM quality monitoring next to the production line with a possibility to be correlated with advanced high-resolution imaging characterization methods in case hazard i.e. deviation from controls (benchmark values) are diagnosed. The ACCORDs framework and tools will contribute to the European Green Deal by addressing the topic: “Graphene: Europe in the lead” and to a “new European strategy on standardisation”.

Acknowledgements

This project receives funding from the European Union’s Horizon Europe Research & Innovation Programme under grant agreement no. 101092796.Funded by the European Union.

Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or European Health and Digital Executive Agency (HADEA). Neither the European Union nor the granting authority can be held responsible for them.

Figures

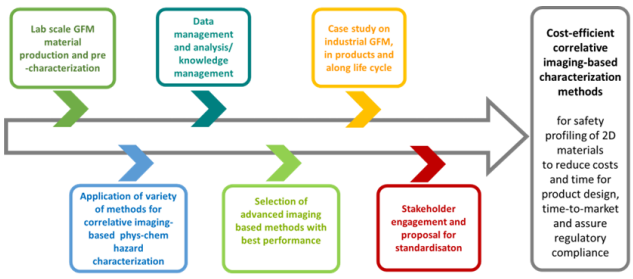

Figure 1. ACCORDs Project Workflow