

addmorepower.eu



@AddMorePower_HE



addmorepower-horizon

**Project
Coordinator**Fraunhofer Institute for Ceramic
Technologies and Systems

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**Coordination
Support**Technikon Forschungs- und Planungs-
gesellschaft mbH

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**Budget****€ 5.9 Million**

100% EU-funded

**Consortium****10 Partners**

6 countries

**Duration****48 Months**

01/2023 - 12/2026

**AddMorePower****ADVANCED MODELLING****AND CHARACTERIZATION****FOR POWER SEMICONDUCTOR****MATERIALS AND TECHNOLOGIES**FOSTERING A MORE RESILIENT
POWER ELECTRONIC INDUSTRY**Project status after two years**

As we celebrate two years since the start of the AddMorePower project, our collaboration continues to grow stronger. The team has worked tirelessly to advance in key areas, from refining our concepts to developing innovative solutions. In the past year, we've achieved significant milestones, such as defending imaging protocols, establishing community standards for CHADA and MODA, and fostering new partnerships across Europe. Looking back, we're proud of what we've accomplished and excited for the next chapter of the project as we push forward in advancing power semiconductor technology.



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Conferences and events

Let's review the events we participated in the past months:

01 14.02.2024 - 16.02.2024 @KU Leuven (Belgium) Technical and Review meeting in Belgium

In February 2024, the AddMorePower team traveled to Belgium for a combination of events: a technical meeting in Leuven and a project review meeting in Brussels.

In Leuven, our host Martin Diehl led the team on a tour of the historic KU Leuven campus and organized a group dinner, offering everyone the opportunity to enjoy authentic Belgian cuisine.

The project review meeting took place on February 16, 2024, in Brussels, just a 20-minute train ride from Leu-

ven. Hosted by the project coordinator, Fraunhofer, at their Brussels office, the meeting ran from 9:00 AM to 4:00 PM. During the session, work package leads presented the progress achieved during the project's first year. While some participants attended in person, others joined remotely.

The discussions and presentations highlighted the achievements of the first year, and the team awaited valuable feedback from reviewers to shape the project's next steps.

02 18.03.2024 - 21.03.2024 @Milan (Italy) MAM conference in Milan

In March 2024, our project coordinator, André Clausner, was invited to speak at the MAM2024 conference in Milan, held from March 18th to 21th. His talk covered advanced characterization and modeling for degradation processes in copper BEoL stacks for next-generation power devices.

The presentation drew a large audience, mainly industry professionals in electronics metallization, who engaged in lively discussions afterward. The event also provided excellent networking opportunities, leading to fruitful exchanges on AddMorePower topics and several follow-up actions.

Mille Grazie to the MAM2024 team for this fantastic event and opportunity!



03

15.04.2024 - 18.04.2024
@Monterey (USA)

FCMN - Frontiers of Characterization and Metrology for Nanoelectronics

In 2024, KAI represented the AddMorePower team at the renowned FCMN conference, a key event for metrology and nanotechnology experts. Learn more about the conference [here](#).

04

25.08.2024 - 30.08.2024
@Copenhagen (Denmark)

European Microscopy Congress 2024

KAI and UL-LEM³ attended the European Microscopy Congress 2024 in Copenhagen, where they connected with experts from the field, exchanged insights, and explored opportunities for collaboration.

05

17.09.2024 - 18.09.2024
@Toulouse (France)

Technical Meeting in Toulouse

From September 17th to 18th, the charming city of Toulouse played host to the latest meeting of the AddMorePower project, bringing together the consortium partners at partner CNRS.

The two-days meeting was a fantastic opportunity for collaboration, knowledge sharing, and strategic planning as we move forward in our mission to advance power semiconductor technology and to increase the share of wide bandgap power devices supplied by European manufacturers.

The first day kicked off with a general update on the project and the progress in each work package. Participants introduced the

latest developments in the AddMorePower project and identified the topics to be discussed in breakout sessions in the remaining one and a half days of the meeting. Then, we got the opportunity to visit the CNRS laboratories and learn more about the beneficiary's premises and services.

As the meeting was about to end, a roadmap for the upcoming months was established, outlining key objectives and timelines.

We look forward to the next meeting and the continued progress of the AddMorePower project. Together, we can make a significant impact in the world of power semiconductors.



06

28.10.2024

@Online

AddMorePower at the MatCHMaker Event

We are proud to share that our coordinator, André Clausner from Fraunhofer IKTS, represented the AddMorePower project at the prestigious MatCHMaker Event: Advances in Characterisation Methods and Computational Modelling.

During the event, André delivered an insightful presentation titled “Advanced Characterisation and Modelling for Degradation Processes in Copper BEoL Stacks of Next-Generation Power Devices“ highlighting key advancements in the field and sparking valuable discussions among industry professionals.

07

04.11.2024 - 05.11.2024

@Dresden (Germany)

European School for Young Material Scientists

From November 4th to 5th, 2024, the European School for Young Material Scientists gathered aspiring researchers, mentors, and experts at Fraunhofer IKTS in Dresden for an engaging two-day event, partially funded by the AddMorePower project.

The event provided a dynamic platform focused on Materials Science and Characterization, key elements of the AddMorePower project. Highlights included:

- Keynote Lecture: A prominent scientist shared groundbreaking insights into the field.

- PhD Student Contributions: Oral and poster presentations showcased innovative research, sparking engaging discussions.
- Networking Opportunities: Participants formed meaningful connections in a collaborative environment.

This event highlighted the crucial role young scientists play in driving innovation and advancing sustainable materials science. A big thank you to all participants, speakers, and organizers for their dedication and enthusiasm!



Work Package status

Let's review the status of each Work Package:

WP1 “Project, risk and innovation management”:

Aligned for operational management and technical vitality. With the main objective to respond to opportunities through active research and innovation management.

- Preparation and conduction of remote and on-site technical and first review meeting.
- Planning and conduction of Advisory board meeting.
- Preparation of two amendments to the Grant Agreement to exclude partner dXs and add new partner Excillum.
- Final check and submission of all Project deliverables.

WP2 “Data management and workflows”:

Laying the ground for open science practices to enable open knowledge transfer between (industrial) research facilities and implementation of a FAIR data.

- AddMorePower Scientific Data Policy V1.0 created with guidelines for the collection, storage, sharing, and ownership of research data.
- First pilots of NOMAD OASIS data parser for DAMASK data, SXDM data and TXRM data are available and published via the AddMorePower Github repository.
- Innovation “FAIR data management for materials characterization labs and materials simulation models” listed as great EU-funded innovation at the European
- Commission innovation radar. Key innovators (KAI, ESRF) are listed as innovator organisation.
- Active contribution to the CEN/CENLEC workshop to standardize materials characterization terminology and structured documentation, resulting in a revised CWA 17815.

WP3 “Advanced X-ray-based characterization methods”:

Develop advanced X-ray-based characterization methods to characterise morphological and structural properties of semiconductor substrates and nano-electronic devices, with high spatial resolution.

- Lab Tomography Data for Cu polyheaters recorded - data will be compared to synchrotron measurements.
- More finely resolved SXDM data acquired on GaN/Si at ID01.
- First XBIC data acquired, including nanoprobe maps .
- First DFXM beamtime on the Cu use case, multiple finely-resolved datasets collected for stressed polyheaters.
- Manuscript for publication on synchrotron results for GaN use case in preparation.
- Operando Time-resolved data on piezoelectric strain field in a HEMT during hard switching recorded at ID01 with stroboscopic pump-probe setup.

WP4 “Advanced electron-based characterization methods”:

Develop techniques for microstructural and electrical characterization of dislocations in active semiconductor layers, identify critical types and provide a methodology and software package related to it.

- ECCI characterization of threading dislocations in GaN is completed. Comparison with HR EBSD is on its way to better assess global dislocation densities.
- The evolution of dislocation microstructure in Cu metallization is nearly understood with density evolution quantified.
- GaN TRCL is progressing with the continued set up of the HC IUMI TEM in CEMES and the automated foil preparation at KAI.

WP5 “Microstructure dependent multiscale and multiphysics modelling”:

Development and implement advanced models ranging from the scale of individual defects to single transistor cells including metallisation, addressing industrial needs by systematic mechanism-based upscaling models and describing individual defects and dislocations.

- Continued the implementation of multi-species diffusion in DAMASK.
- Presented first simulation results of single threading dislocation elastic fields in GaN.
- Modified the simulations of wedge grain boundary arrangement for curved grain boundaries and showed that curved grain boundaries might be sufficient to produce tensile strains in the copper.

WP6 “Demonstration and validation”:

Demonstrating and validating newly developed characterization and modelling techniques and aligning the characterization and modelling work packages so that industry-relevant problems can adequately be resolved.

- Designed a kind of common epi stack including variable process flow to fulfil all the different analysis requirements and analysis techniques at the partners.
- Processing and preparing of new samples for Holography, EPIC, XBIC and ECCI.

WP7 “Dissemination, communication, exploitation and standardisation”:

The main objectives are the targeted dissemination of the project and its results, internal and external communication of the project, contribution to the European Research Union, as well as the exploitation of the scientific results to create competitive advantage with innovative research and results.

- Participation to conferences and events.
- Website and Social Media activities (e.g. Project ABC).
- Further Dissemination material (e.g. Interviews).

Outlook

The first two years of the project have been a success, and we are proud of the progress made so far. As we enter the third year of AddMorePower, we look forward to the upcoming conferences,

talks, and events where we will continue to share our technical achievements and innovations with you.

**We are eager for all that is yet to come.
Stay tuned.**

AddMorePower Consortium

The AddMorePower consortium consists of ten highly qualified partners from five countries (Germany, Austria, France, Czech Republic and Belgium). Among them are four highly innovative research centres, a large internationally recognized industry partner for material and component production, an industrial

competence center, two large research-based universities and two highly skilled multicultural SMEs.

The AddMorePower consortium represents a diverse pool of skills and competencies to address and solve the industry's many challenges.



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Video interviews

Presenting the key researchers and scientists of the project:

Olivia Pfeiler, head of KAI's Data Science team (KAI).

Cedric Corley-Wiciak, researcher at the European Synchrotron Radiation Facility (ESRF).

Martin Diehl, assistant Professor at KU Leuven's Department of Materials Engineering.



Upcoming Events

Visit our website for more info: addmorepower.eu/events/

All past and upcoming events can be found on the AddMorePower official webpage.