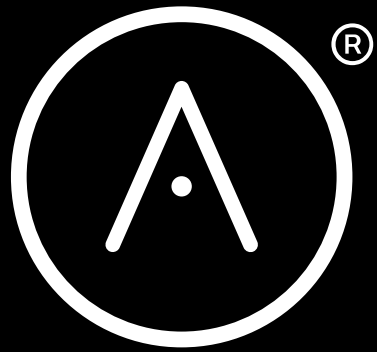


ATLANT 3D[®]

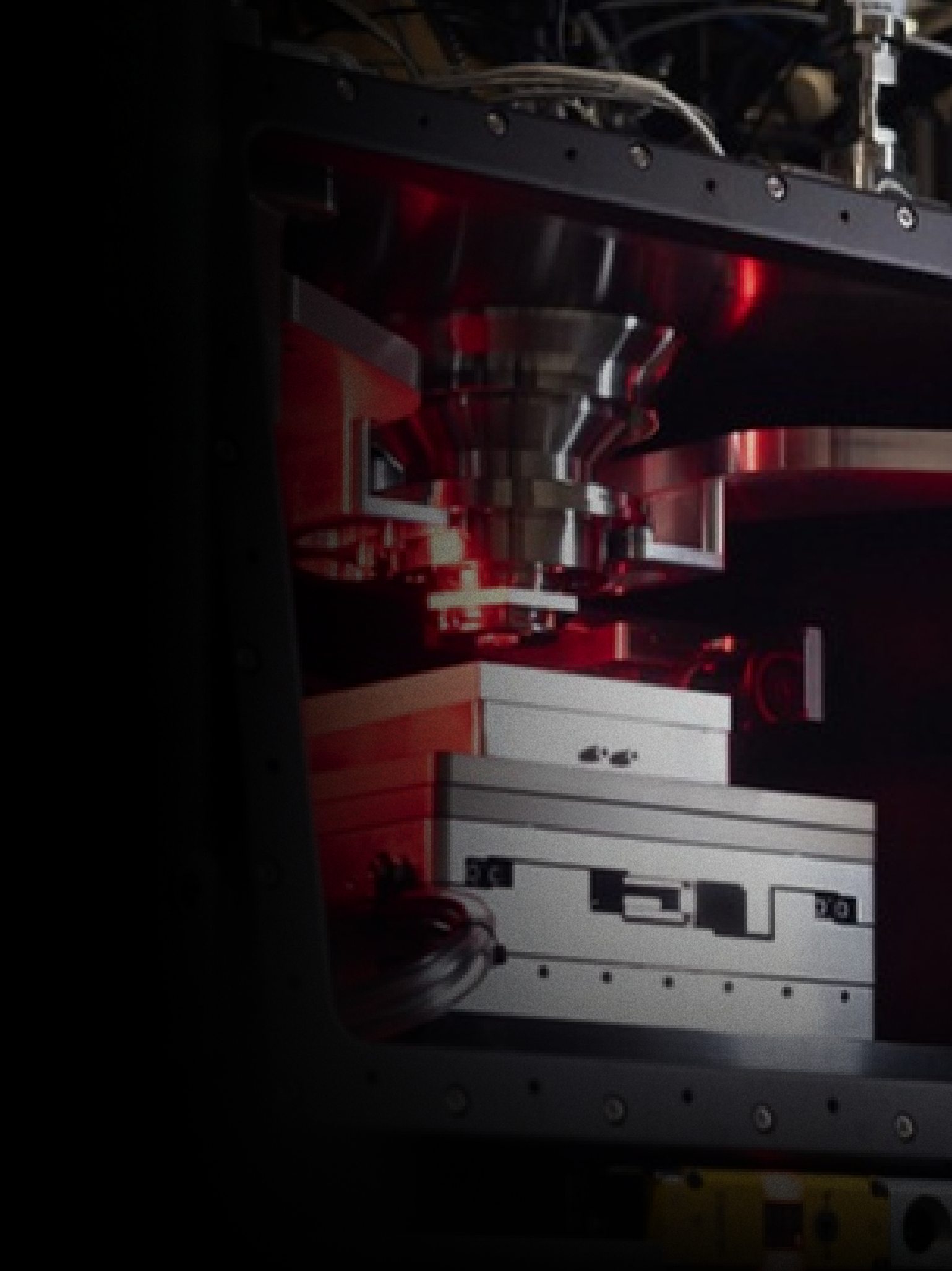


www.atlant3d.com

● TECHNOLOGY BROCHURE

DIRECT ATOMIC LAYER PROCESSING (DALP[®])

Proprietary Technology Powering NANOFABRICATOR[®]
Platforms for Atomic-Scale Manufacturing



INTRODUCTION TO ATLANT 3D

Shaping the Future of Advanced Materials Innovation and Atomic-Scale Manufacturing.

ATLANT 3D is pioneering a new era of advanced manufacturing built on atomic precision. At the core of our platform is our proprietary Direct Atomic Layer Processing (DALP®) technology — a programmable nanofabrication process that deposits and etches materials locally and directly onto substrates without masks, batch tools, or vacuum breaks. Compatible with 450+ materials, DALP® compresses innovation cycles from years to days while reducing chemical and energy consumption by over 90% compared with conventional cleanroom workflows.

Powered by DALP®, our NANOFABRICATOR® systems provide a full-stack platform integrating hardware, software, materials and process IP, and a data layer to accelerate materials discovery, process development, and device integration. The platform supports applications across semiconductors, advanced packaging, energy, MEMS and sensors, quantum technologies, aerospace, and other emerging industries.

Founded in 2018, ATLANT 3D collaborates with leading industrial and research partners worldwide to accelerate the path from R&D to qualified production. Headquartered in Copenhagen with operations across the US and UK, we have built the physical infrastructure that transforms AI-designed materials into functional devices for industry impact.

PARTNERS & CUSTOMERS

SONY

NASA

MERCK



esa

SAL
SILICON AUSTRIA LABS

FAU
Friedrich-Alexander-Universität
Erlangen-Nürnberg

ThalesAlenia
Space

SIEMENS

University
of Vermont

NUS
National University
of Singapore

European
Commission

OUR NANOFABRICATOR[®]S

ATLANT 3D has created two distinct NANOFABRICATOR[®] platforms:

NANOFABRICATOR[®] LITE is a compact and versatile material innovation & prototyping platform, designed for scientific R&D.

NANOFABRICATOR[®] PRO is a high-performance platform for material discovery, process integration, advanced device development, and industrial fabrication, designed for both R&D environments and integration into semiconductor and advanced manufacturing process lines.



NANOFABRICATOR[®] LITE



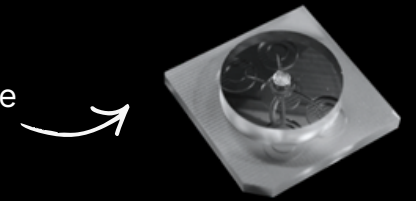
NANOFABRICATOR[®] PRO

NOZZLES

There are three types of interchangeable quartz nozzles required for tool operation. They can be cleaned for re-use, or purchased as a consumable. We have a dedicated team behind the development of innovative nozzle architectures, meeting the needs of an ever-growing set of applications.

+ DALP[®] Micronozzle:

Standard line width resolution: 350-400 μm , with finer line width nozzles in development.

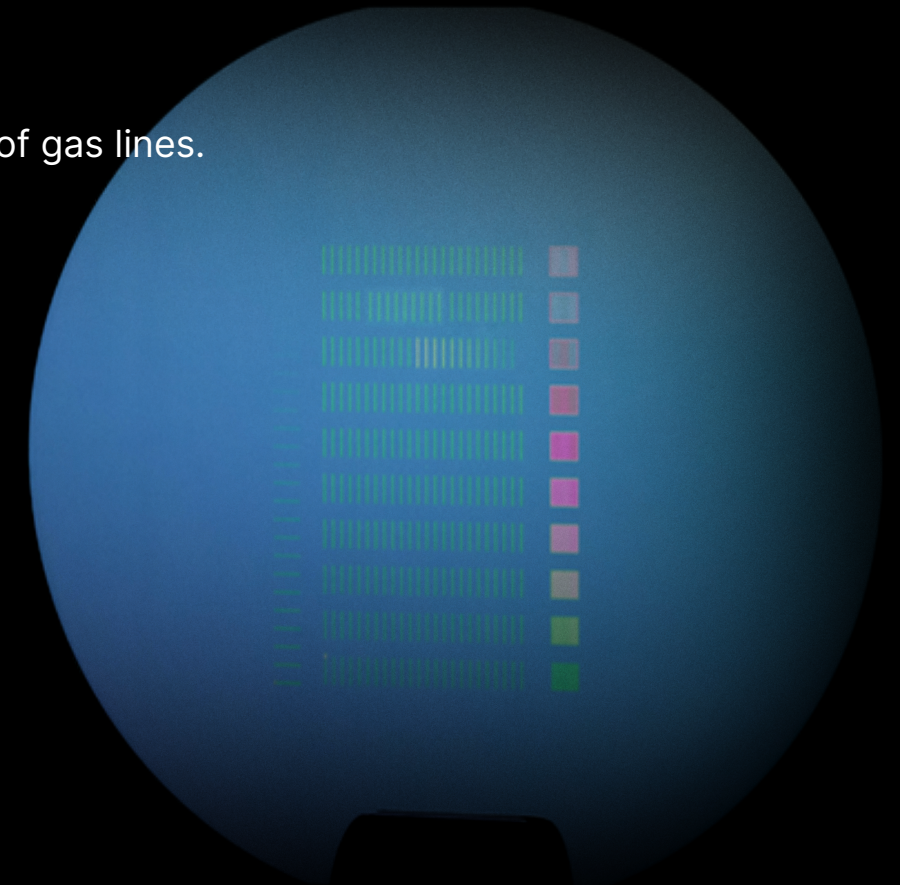


+ BLANK Nozzle:

For capping gas system when not in use.

+ PURGE Nozzle:

For extensive purging of gas lines.





OUR PROPRIETARY TECHNOLOGY

Bridging digital intelligence and industrial fabrication to enable AI-driven materials discovery, process development and integration into scalable production.

DALP® Technology

DALP® enables direct, localized atomic-scale material processing by positioning a micronozzle at a controlled working distance above a moving substrate.

ATLANT 3D's proprietary Direct Atomic Layer Processing (DALP®) platform technology supports precise deposition and etching of multiple materials, reducing reliance on conventional batch-based fabrication workflows and enabling software-defined manufacturing at the atomic scale.

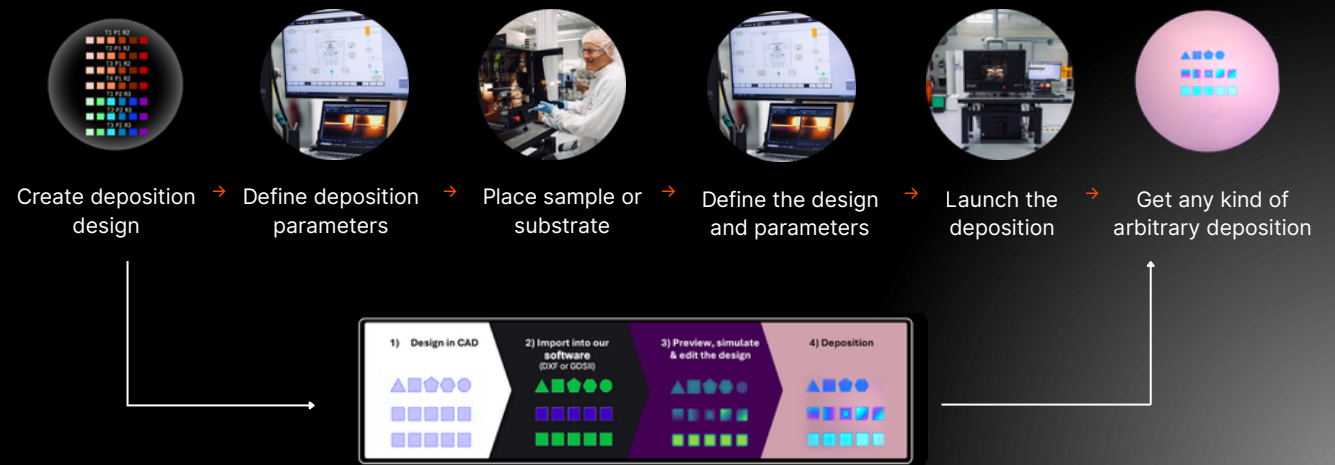
“ As a scientist, I believe the future of innovation depends on our ability to discover, develop, and manufacture new materials faster and more precisely than ever before. At ATLANT 3D, we are building the platform that allows researchers and engineers to develop advanced materials and devices with atomic-scale precision, accelerating the transition from R&D to industrial impact.

Dr. Mira Baraket
Chief Technology Officer



End-to-End Process Workflow

A seamless process from digital design to physical fabrication, enabling rapid iteration and scalable production.



DALP® TECHNOLOGY BENEFITS

Why it Matters

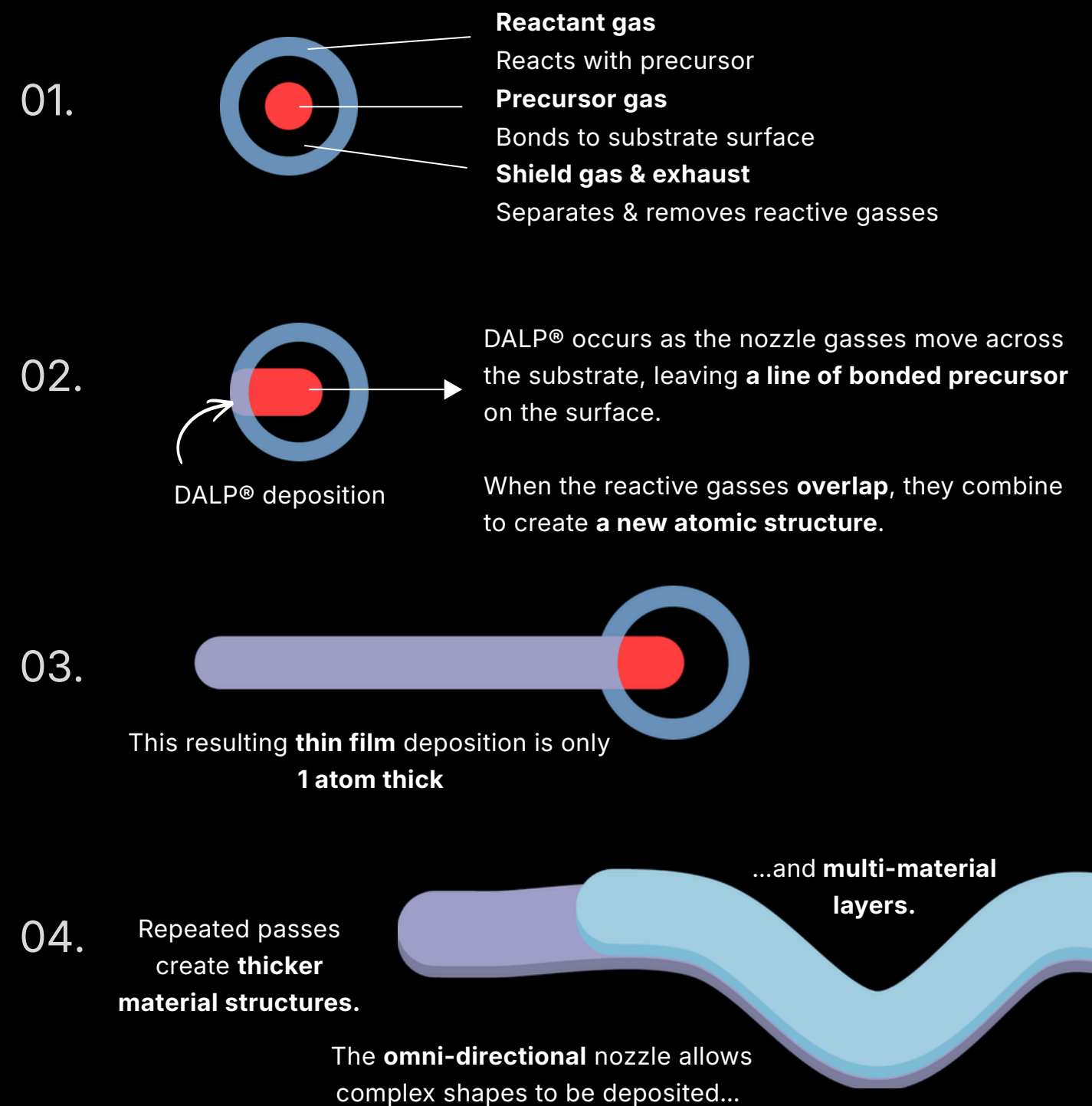
- Accelerates materials innovation **from years to days**
- Accelerates device prototyping and industrial integration
- Enables direct transition **from lab to fab**
- Reduces reliance on complex global supply chains
- Supports more **sustainable** and **localized manufacturing**

Key Advantages

- ✓ Direct-write patterning at micron scale
- ✓ Localized ALD, ALE, and MLD processes
- ✓ No photoresist, masks or etching
- ✓ Multi-material deposition in a single workflow
- ✓ Reduced process steps & tool transfers

HOW IT WORKS

ATLANT 3D's patented micronozzle channels reactive & shield gasses into the pattern shown:



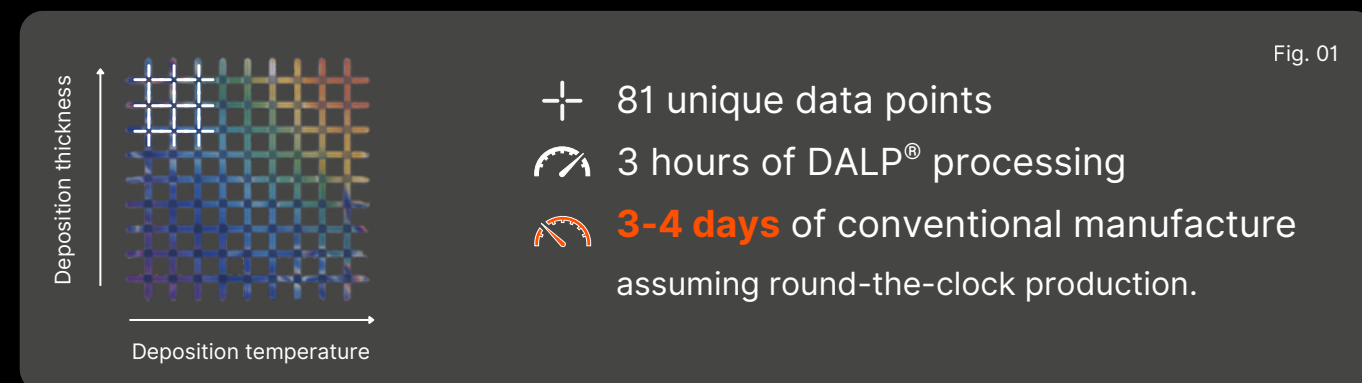
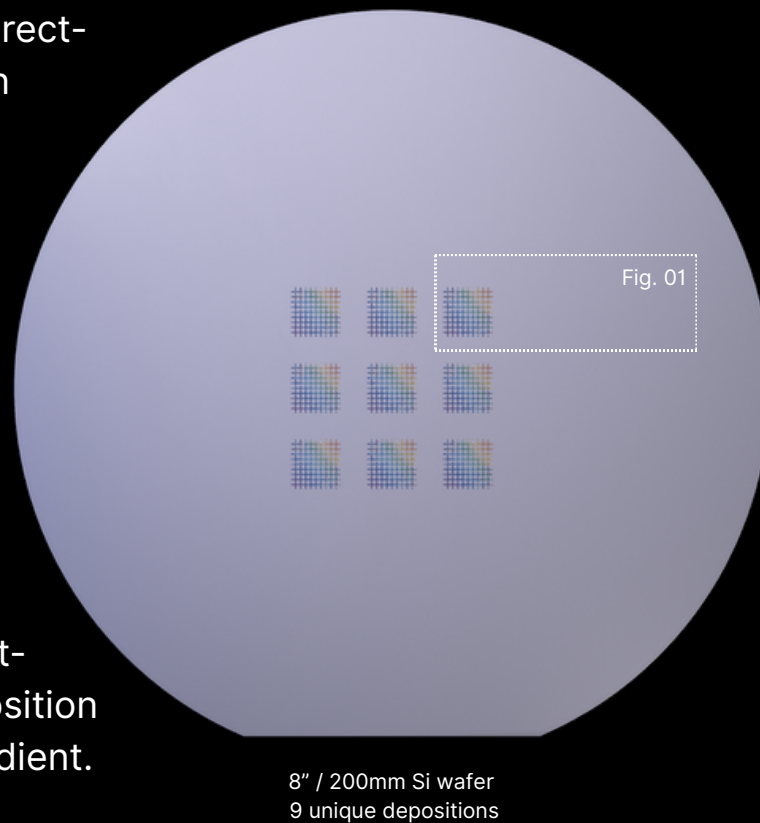
ACCELERATING INNOVATION WITH DALP® ...

DALP® technology is applicable to a multitude of applications at every stage of development, from R&D to prototyping and fabrication.

As DALP® is a lithography-less, direct-write process, the speed at which experimental designs can be deposited, characterized, iterated and re-deposited is orders of magnitude faster than conventional processing techniques.

In this example, a material is deposited in a grid comprising single lines. In one axis, the lines increase in thickness along a controlled gradient. In the other, deposition temperature is increased in a gradient.

Every intersection provides a unique ratio of material properties. In a matter of hours, thousands of unique data points can be produced. Using the conventional techniques takes months.



... FROM MONTHS TO HOURS

In this example deposition, 9 unique depositions, producing a total of unique 729 data points were printed on a single silicon wafer.

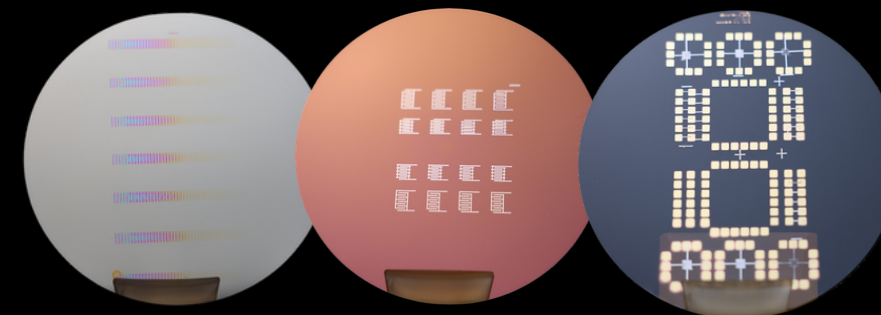
The entire deposition takes less than a day, and is fully automated, allowing it to run overnight and without an operator.

The deposition is ready to be characterized, tested or implemented immediately, with no post processing steps required.

- + 729 unique data points
- + 18 hours of DALP® processing
- + 1 month of conventional manufacture to produce an equivalent quantity of data.

Using the NANOFABRICATOR®'s design software, DALP® Designer, complex patterns and structures can be created, driving a breadth of experimental and fabrication possibilities.

NANOFABRICATOR® PRO's advanced integration capabilities now enables to the development process to accelerate even further, with automated wafer handling and in-situ metrology, QA, and closed-loop feedback – the ideal hardware setup for integrated AI.

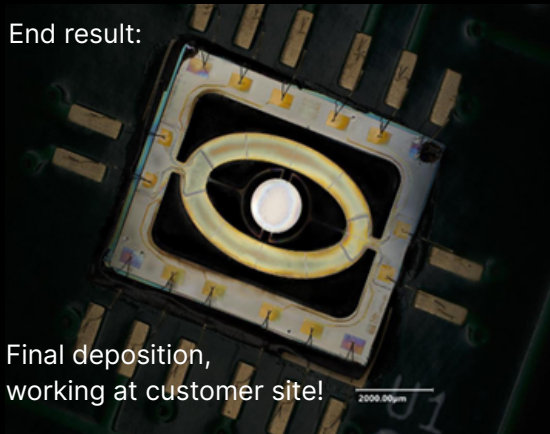


From left to right:
Material Development, Device Prototyping, Device Fabrication

APPLICATIONS OF DALP®

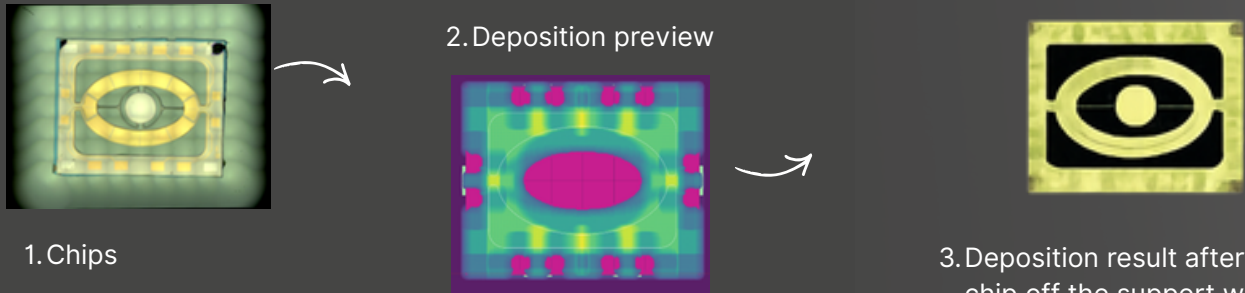
Some examples of how DALP® platform technology is being used in emerging markets:

End result:



Final deposition, working at customer site!

ADVANCED PACKAGING: **ENCAPSULATION LAYERS**



1. Chips

2. Deposition preview

3. Deposition result after taking the chip off the support wafer

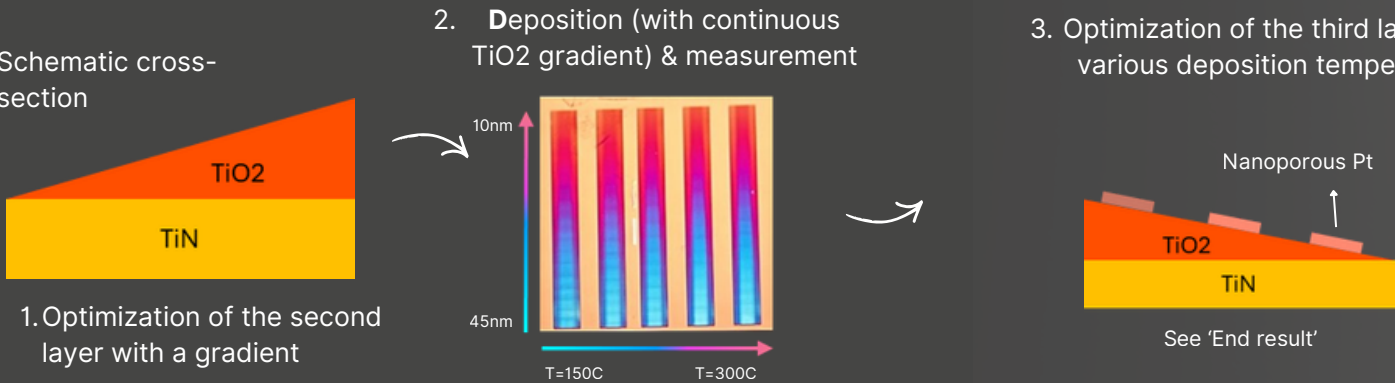
Collaborator: 

End result:



150-stack configuration completed in 15 hours (NANOFABRICATOR® LITE), down from 10 weeks.

RAPID PROTOTYPING: **ELECTROCHEMICAL SENSORS**



Schematic cross-section

1. Optimization of the second layer with a gradient

2. Deposition (with continuous TiO2 gradient) & measurement

3. Optimization of the third layer with various deposition temperatures

Nanoporous Pt

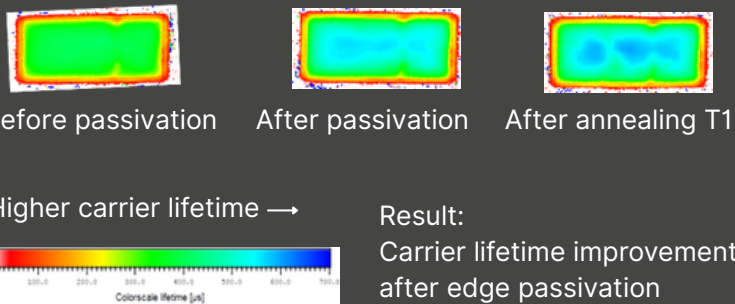
See 'End result'

Optical image of the solar cell corner



End result:

DIRECT AND LOCAL EDGE PASSIVATION: **SOLAR CELL**



Before passivation

After passivation

After annealing T1

Higher carrier lifetime →

Result: Carrier lifetime improvement after edge passivation

Nandan Singh Ruhela
Process Engineer, Technology R&D
Taken in A-HUB Copenhagen, Denmark

START THE CONVERSATION

Let´s Explore how DALP® can Accelerate your Application.



+ Dr. Bonnie Tsim

VP of Commercial Strategy and Partnerships

sales@atlant3d.com

LET’S DISCUSS

- Materials & device research
- DALP® process development
- Prototyping & validation
- Pathways from R&D to scale



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Mårkærvej 2B, 2630 Taastrup
Copenhagen, Denmark
+45 2229 0080