

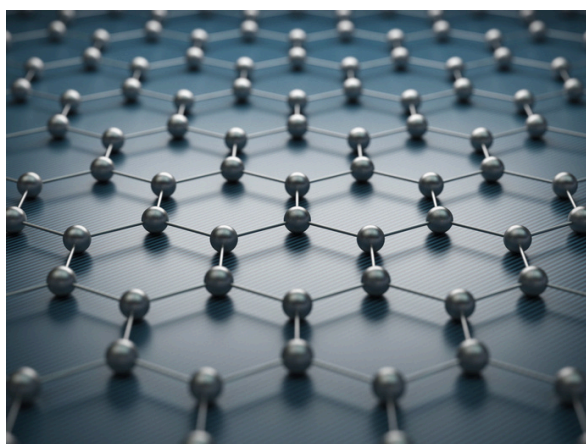
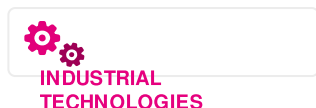
HORIZON
2020

Scalable Production and Integration of Graphene

Results in Brief

Unlocking the potential of graphene electronics

Backed by EU funding and support, one company has scaled up and automated its graphene-producing technology.



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A sheet of carbon just one atom thick, graphene is a remarkable material. Not only is it the thinnest, lightest and strongest substance in existence, thanks to its two-dimensional nature, it's also an excellent conductor of heat and electricity – making it the material of choice for semiconductors.

“Incorporating graphene into chip technology can transform functional capability in areas such as power consumption and sensitivity,” explains Richard van Rijn, chief technology

officer at [Applied Nanolayers](#)  (ANL).

According to Van Rijn, while graphene has the potential to take semiconductor technology to the next level, there is one problem: a lack of suitable large-scale production processes and transfer technology.

“As a result, graphene remains nearly impossible to manufacture with the quality and consistency required by the semiconductor industry,” he says.

ANL was founded with the purpose of developing the necessary technology and tools for producing, transferring and exploiting quality graphene on an industrial scale. Now, thanks to the support of the EU-funded SPRING project, the company has

scaled up and automated its graphene material foundry technology, bringing it to the commercialisation stage.



High-volume, high-quality graphene production

The project allowed ANL to accomplish two things. First and foremost, the company was able to further automate its existing graphene growth and dry transfer processes. “We demonstrated that this can be done on semiconductor production equipment at high volume and at a repetitively high quality, both of which are required for real commercial applications,” remarks Van Rijn.

However, just making high-quality graphene isn’t enough to achieve the intended commercial applications. Thus, the SPRING project also helped ANL develop the state-of-the-art integration and post-processing capabilities needed to develop such targeted commercial applications as sensors.

“Having achieved both of these goals enables us to meet our industrial customers’ needs now,” notes Van Rijn. “In fact, all of our customers have reported back that we offer the highest quality chemical vapour deposition graphene they’ve ever seen.”

Opening the door to a plethora of graphene-based products

Part of the [European Innovation Council Accelerator programme](#) , ANL also benefited from business coaching and being able to participate in the [International Trade Fairs programme](#)  – two initiatives that were fundamental to the company being able to advance its technology beyond TRL 6.

“Thanks to the EU’s funding and support, I expect that five years from now we will see a plethora of graphene-based products on the market – all of which can be traced back to this project,” concludes Van Rijn.

The company is currently focused on helping its industrial customers develop graphene-based products and bring those products to market. ANL is also working to expand its own manufacturing volume to ensure it can continue to provide its customers with their anticipated volume needs.

Keywords

SPRING, graphene, graphene electronics, carbon, semiconductors, chip technology, sensors

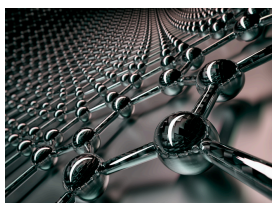
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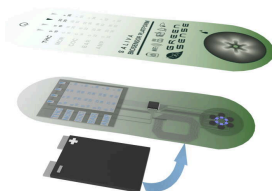
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Grant agreement ID: 881273

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[10.3030/881273](https://doi.org/10.3030/881273) 

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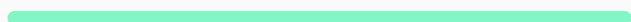
24 September 2019

Start date

1 October 2019

End date

30 September 2023



Funded under

INDUSTRIAL LEADERSHIP - Innovation In SMEs

Total cost

€ 3 502 500,00

EU contribution

€ 2 451 750,00

Coordinated by

APPLIED NANOLAYERS BV



Netherlands

Last update: 16 February 2024

Permalink: <https://cordis.europa.eu/article/id/449254-unlocking-the-potential-of-graphene-electronics>

European Union, 2025