Application Note

# Accelerating Electrochemical Glucose Sensor Prototyping

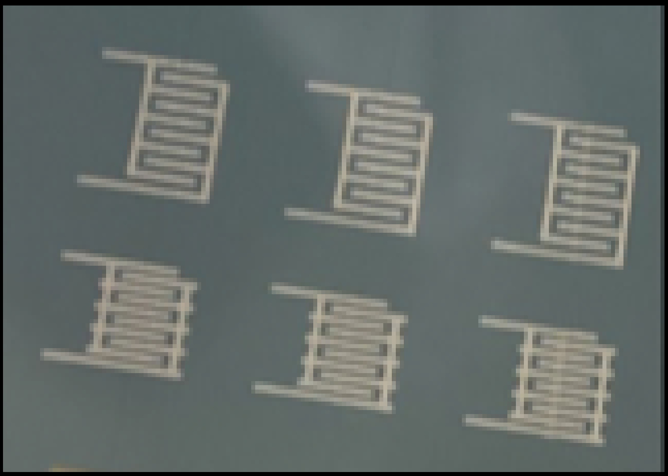
ATLANT 3D®

# Electrochemical Glucose Sensor

## Introduction

Electrochemical glucose sensors measure glucose levels in biological fluids by converting the biochemical reaction of glucose oxidation into an electrical signal. They are vital in diabetes management, allowing patients to monitor blood glucose conveniently. Typically, they use enzymes like glucose oxidase, which react with glucose to produce an electric current proportional to the glucose concentration.
Unfortunately, standard sensor fabrication processes entail several shortcomings, including:

- Multiple fabrication steps
- Limitations on designs and materials
- Possible integration incompatibility

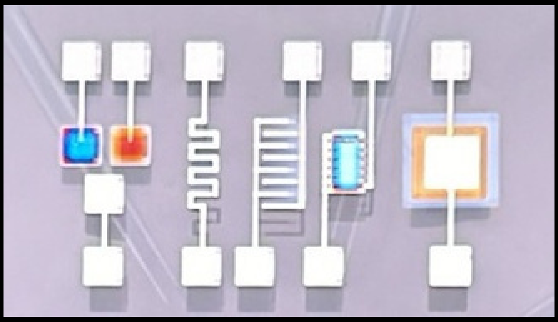


Interdigitated Pt designs on Si substrate

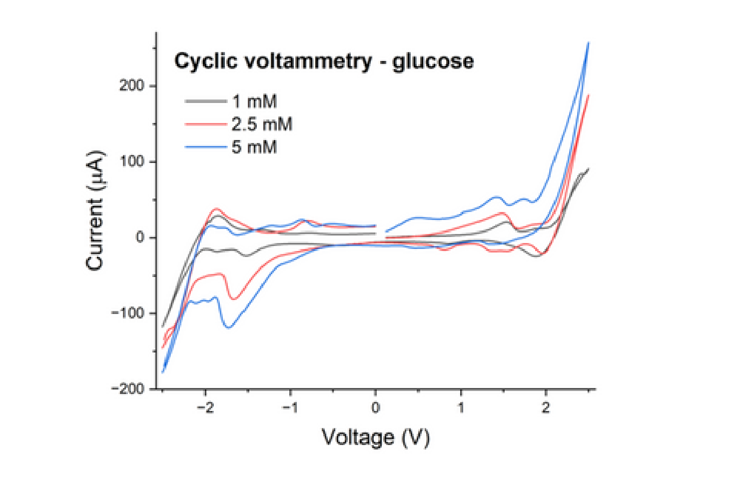
This limits the sensor's versatility and increases costs.
With ATLANT3D Technology, we can directly print patterned films onto the desired device. The flexibility of our DALP process allows for material changes within a single-step process. We offer limitless design possibilities to optimize sensors for specific applications and ensure seamless integration.

## Results and discussion

With DALP, we fabricated a Pt/$TiO_2$ electrochemical sensor and tested it to detect glucose.
We analyzed the oxidation current at different glucose concentrations and measured the linearity and sensitivity of the sensors.
Our glucose sensors showed sensitivity comparable with state-of-the-art products and a market-ready linearity of 0.995 (maximum is 1).



Different sensors (Pt, ZnO and $TiO_2$) printed on glass in 1-step process.

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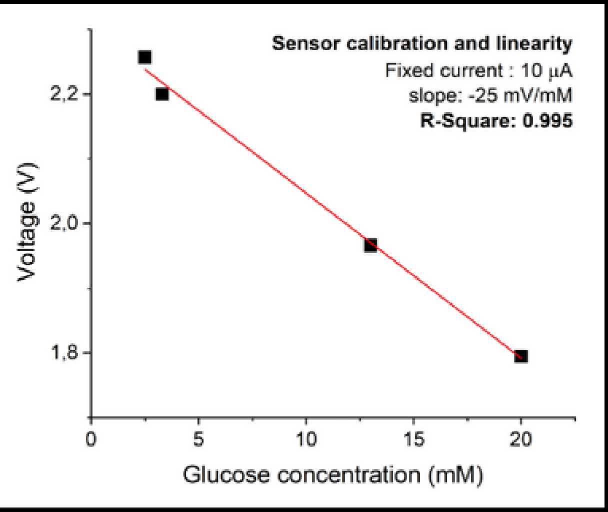



The calibration curve constructed from chronopotentiometry shows an almost perfect linearity of 0.995 when the maximum is 1.

## Conclusion

ATLANT3D's DALP technology effectively addresses the limitations of traditional electrochemical glucose sensor fabrication by enabling direct printing of patterned films and allowing material changes within a single-step process. The limitless design possibilities and seamless integration offered by DALP hold significant promise for optimizing sensors for specific applications. Overall, ATLANT3D's technology has the potential to revolutionize electrochemical sensor fabrication, benefiting diabetes management and beyond.

# ATLANT 3D AT A GLANCE

## FOUNDED 2018

- HQ: Copenhagen Denmark
- US Entity
- UK Entity

## PROPRIETARY DALP™

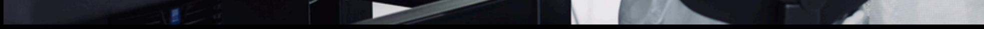
- Direct Atomic Layer Processing Technology

## MARKET FOCUS

- Fundamental & Industrial R&D
- Emerging Technologies
- Microelectronics
- Optics & Photonics

## 40 TEAM MEMBERS

- Expertise in ALD and Material Science,
- Advanced Applications and Devices
- Advanced System and Software Engineering



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