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Ph.D. thesis (2022-2025)
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BeFC (B. Demir)

Coupling biofuel cells and physiological sensors with printing technologies for the development of autonomous devices

Couplage de bio-piles à combustibles et de capteurs par des technologies d'impression pour la mise au point de dispositifs autonomes

FunPrint

Context / Objectives

Legacy technology

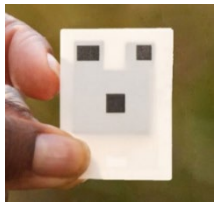
- Bio-enzymatic fuel cell

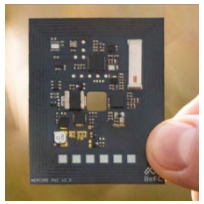
Stack of 7 layers (carbon, paper)

- Electronic platform

Flexible substrate and component implementation (e.g. sensors)

BeFC Bio-enzymatic fuel cell (left) and associated electronic platform (right)





Printing technologies advatanges

For bio-inks and sensor inks

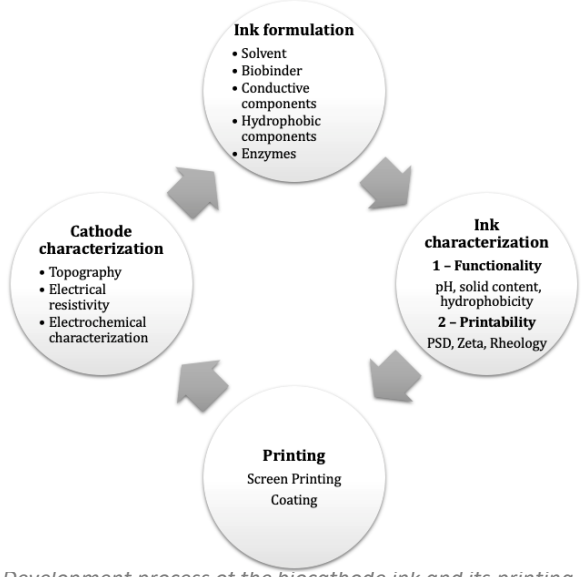
- Upscale (10 million unit a year) + high throughput
- Production cost's improvement
- Eco-friendly components
- Hybridization on common substrates

Funded by: ANRT Association Nationale Recherche Technologie

In collaboration with BeFC Bioenzymatic Fuel Cells

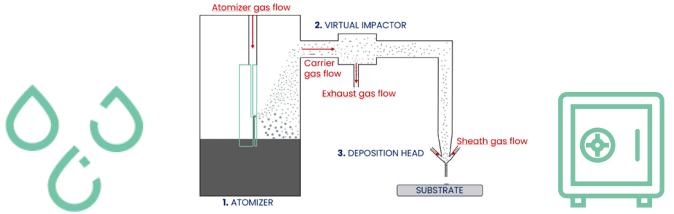
Methods

Enzymatic biocathode formulation



Development process of the biocathode ink and its printing

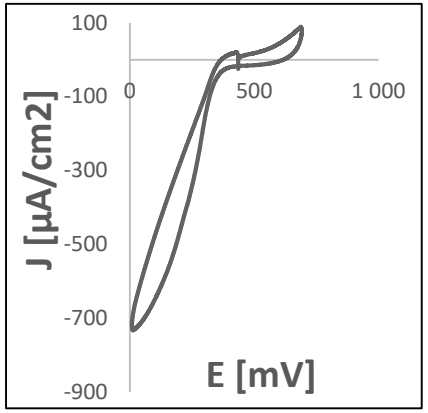
Printed Temperature Sensors



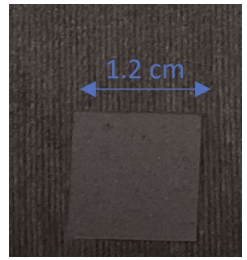
Ink Formulation *AJP Process* *Climatic Chamber*

Results

Printed biocathode performances

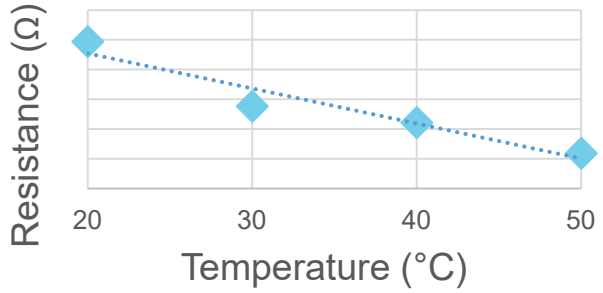


Cyclic voltametry (1mV/s)



Printed cathode

Printed temperature sensor performances



Conferences:
Bessac, E & al. (2023). *Jarigai*. Wuppertal, Germany.