

Materials Science Department

## Printed electrochemical devices

CEMOP / I3N

Microelectronics and Optoelectronics Group



**Paweł Jerzy Wójcik**

Student

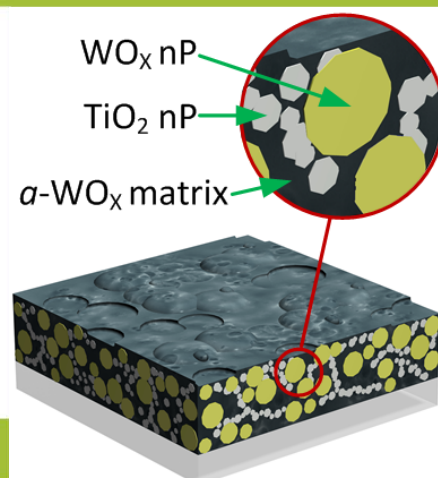
2008 – present, PhD student, UNL

2002 – BSc in Microelectronics and Microsystems, Wrocław University of Technology, Poland



## Objectives

Material synthesis, technological processing and characterization for organic and inorganic printed (e.g. inkjet, screen- and flexo-printing) electrochemical devices such as dye solar cells (working as DNA/RNA biosensor), electrochromic devices (passive monochromatic matrixes), electrolyte gated transistors and basic printed electronic elements.



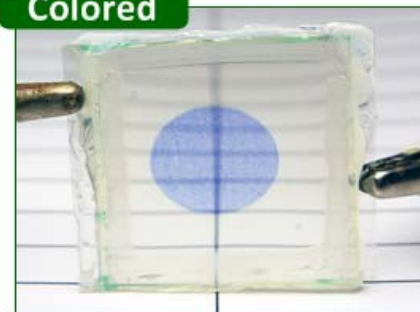
## Methodology

1. Design of Experiment (DOE) for optimization of materials and processes in printed electronics.
2. Functional inks formulation based on:
  - sol-gel process,
  - thermosetting macromolecular chemistry,
  - metal and metal oxide nanoparticles
3. Synthesis of thermosetting composite solid state electrolytes for printed electrochemical devices.
4. Printing processes for sheet-to-sheet and roll-to-roll manufacturing.
5. Applied nano-electrochemistry.

**Bleached**



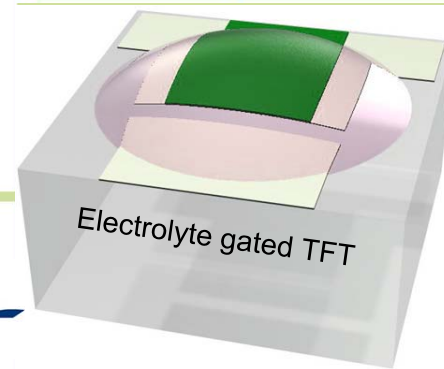
**Colored**



## Expected Results

Fully printed prototypes of energy efficient electrochemical devices such as electrochromic displays, photovoltaic cells and TFTs.

Integration of prototypes in autonomous systems for smart packaging, automotive applications and ID cards.



Funding:



UNINOVA

