



Journées Grand Sud-Ouest de la Société Chimique de France

11-12 Juillet 2022, Toulouse

Aptasensors for the detection of emerging contaminants: development of an electrochemical platform

Quentin Palas,^a Adama Drabo,^a Thomas Ibar,^a Mohammed Amine Berkal,^a Corinne Nardin,^a Christine Lartigau-Dagron,^a Luisa Ronga^a

^a Université de Pau et des Pays de l'Adour, E2S UPPA, CNRS, IPREM, Pau, France

Mél : [quentin.palas@univ-pau.fr]

This work is part of a four-years research project, which aims at the development of a sensitive and selective electrochemical aptasensor as an analytical strategy to detect, *in situ* and in real time, contaminants (pesticides and drugs) in water.

In this context, the objective of my work is the development of the transducer to be integrated in the electrochemical platform to eventually achieve efficient aptasensing. The approach we do investigate shall provide electrodes of high specific surface area and enable the controlled covalent grafting of the selected aptamer.

Two strategies have been chosen to functionalize carbon electrode surfaces: either the use of conducting polymers or the deposition of self-assembled peptides.

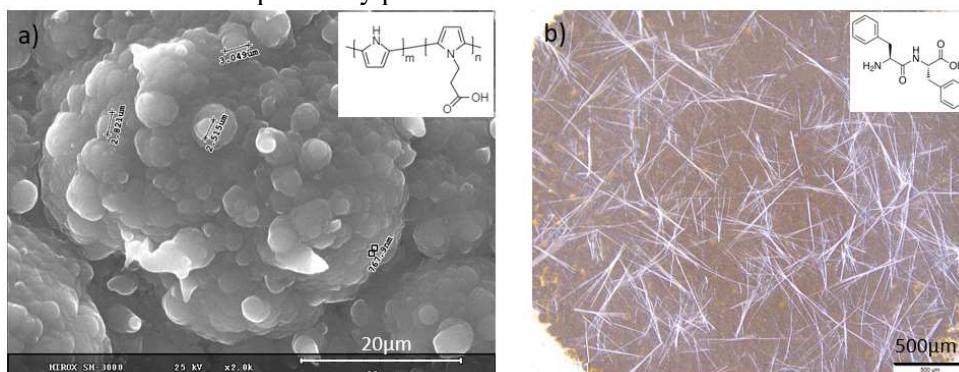
The first approach is focused on the electropolymerization of pyrrole¹ with suitable functional groups allowing the covalent grafting of the aptamer.

The second one is based on the self-assembly of diphenylalanine (FF)² dipeptide in order to obtain a stable coating on the electrode surface.

The two strategies were developed in parallel to determine strengths and limitations of both approaches. Several aspects were taken into account in our study: the conditions to form stable structures, the achievement of homogeneous coatings on carbon electrodes, the electrochemical properties, the wettability and the possibility to perform the covalent grafting of aptamers.

Several techniques were employed to reach these aims: optical microscopy, scanning electron microscopy (SEM), cyclic voltametry (CV), contact angle, X-ray photoelectron spectroscopy (XPS), infrared spectroscopy (FTIR).

Our main results on the development and characterization of the electrochemical platform based on polypyrrole and FF will be comparatively presented here.



a) SEM of polypyrrole electropolymerized on carbon electrode and b) optical microscopy of FF fibers on carbon electrode.

[1] Malhotra, B. D.; Chaubey, A.; Singh, S. P. *Analytica Chimica Acta* 2006, 578 (1), 59–74..

[2] Yan, X.; Zhu, P.; Li, J. *Chem. Soc. Rev.* 2010, 39 (6), 1877.