UNIVERSITÉ DE PAU ET DES PAYS DE L'ADOUR

AVIS DE SOUTENANCE DE THÈSE

Eleftheria BATAGIANNI

CANDIDAT(E) au DOCTORAT CHIMIE,
à **L'UNIVERSITÉ DE PAU ET DES PAYS DE L'ADOUR**
SOUTIENDRA PUBLIQUEMENT sa THÈSE

le **09 novembre 2020** à **10h00**
à L'UNIVERSITÉ DE PAU ET DES PAYS DE L'ADOUR
Amphithéâtre de l'IPREM

SUR LE SUJET SUIVANT :

"Synthèse et caractérisation des copolymères amphiphiles pour des applications bioélectroniques"

JURY :

Didier BEGUE, Professeur des Universités, UNIVERSITÉ DE PAU ET DES PAYS DE L'ADOUR
Roger HIORNS, Directeur de Recherche CNRS, IPREM - UNIVERSITÉ DE PAU ET DES PAYS DE L'ADOUR
Pietrick HUDHOMME, Professeur des Universités, UNIVERSITÉ D'ANGERS
George MALLIARAS, Professeur, UNIVERSITÉ DE CAMBRIDGE (ROYAUME-UNI)
Corinne NARDIN, Professeur des Universités, UNIVERSITÉ DE PAU ET DES PAYS DE L'ADOUR
Patricia TARGON CAMPANA, Maître de Conférences, UNIVERSITÉ DE SAO PAULO - USP (BRESIL)

Pau, le 04 novembre 2020

Le Président et,
Par délégation, la Vice-Présidente de la Commission de la Recherche

p.o. Isabelle BARAILLE

S. Mercier
Directrice ED 211

UNIVERSITÉ DE PAU ET DES PAYS DE L'ADOUR
Avenue de l'Université
BP 576
64012
PAU Cedex
Tél. : 05 59 40 70 00
www.univ-pau.fr

THESIS: Synthesis and characterization of amphiphilic block co-polymer for bioelectronic applications.

PhD student: Eleftheria BATAGIANNI

Directors: Didier BÉGUÉ and Roger C. HIORNS (IPREM)

Abstract

Nowadays bioelectronic devices have found fertile ground in a variety of applications and have significantly contributed in improving healthcare, environmental protection, and accelerating the pace of scientific progress. The development of organic electrochemical transistor (OECT)s has found applicability in various bioelectronic devices since they can interface with electrically active tissues and organs to measure cell activity. In this rapidly evolving field, there is an emerging need for new materials which can replace existing ones by tackling their limitations and assisting in the implementation of new improved and innovative devices.

The objective of our work was to prepare innovative fullerene based polymers and their amphiphilic block copolymers for bioelectronic applications. At the *Université de Pau et des Pays de l'Adour* we synthesized main-chain poly(fullerene)s *via* a facile one-pot synthetic route using non-toxic starting materials. These polymers were then used to obtain metal-free amphiphilic block copolymers. We performed preliminary and kinetic studies to understand the effect of the reaction parameters (reagents, reagents ratio, temperature, polymerization time and solvent). To investigate the characteristics of the synthesized products we performed SEC chromatography, NMR and UV-visible spectroscopies, while their thermal profile was obtained *via* TGA and DSC analysis. It's highly possible that these n-type materials can be suitable for medical applications such as bioelectronic and/or biosensing devices. Therefore, during a three month stay at the University of Cambridge, we had the opportunity to study the electronic conductivity of the synthesized poly(C_{60})s and its amphiphilic block copolymers.