Post-doctoral research position

Introduction

Modern electronic systems require increasing functionality, greater circuit density, lower cost and better environmental performance. Since it's easy to imagine that how life will be if electronic products are similar in thickness to paper and can be folded into our pockets, a high level of interest and effort are being put into printed electronics. Numerous products such as antennas, medical diagnostic device components are nowadays mass printed on flexible substrate with industrial processes. However, such processes are limited in term of resolution (circuitry line width>50µm). Moreover, the production cost is impacted by the need of multiple chemical and thermal treatments of the polymer substrate in order to improve the adhesion of the ink. These limitations demonstrate that an improvement of the efficiency of the printing technique is needed in order to answer the growing demands on low cost flexible complex systems.

Post-doctoral mission

The main objective of our project is to show that photo-sensitive polymers with controlled properties could represent a new and interesting class of material for the flexible electronic industry. Indeed, it is known that upon irradiation and depending of the chemical structure, the cis-trans isomerization of azo-polymers can lead to major changes in the thermo-mechanical properties (i.e. modulus, glass transition temperature *Tg*…) of the polymer. In this project we want to use this special property as a method to promote the adhesion of metal circuitry on flexible substrate. The project will be focused on the synthesis of azo-based copolymers with the objectives of controlling their isomerization wavelengths and thermo-mechanical properties. The polymer design will be optimized in collaboration with the IPREM laboratory in Pau, which masters the synthesis of azo-based copolymers. Then thin films will be prepared from these compounds and the mechanical properties upon irradiation will be investigated using scanning probe microscopy. Finally, once the best chemical structures allowing a controlled variation of the mechanical properties will be reached, the films will be tested as a substrate for the imprinting of an electrical circuitry using an industrial process in collaboration with a partner located in Grenoble (LGP2).

Requirements

- PhD in chemistry, physico-chemistry or polymer science
- Preference will be given to applicants having experimental skills in: polymer synthesis, thin polymer films elaboration, directed self-assembly and characterization, scanning probe microscopy.
- The initial part of the project will be done in the IPREM laboratory (Pau), then film elaboration and characterization will be done in the IMMM lab (Le Mans).

Duration: 1 year

Starting date: before 01/01/19

Research laboratories: IPREM – Pau (France), IMMM – Le Mans (France)

How to apply:

Send letter(s) of reference and a CV including a list of publication, a description of your research experience and interests to:

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