Research Grants for PhD students from the China Scholarship Council

Information Form (please read the guidelines carefully on the website www-csc.utt.fr)

Supervisor's name : DESILLES Given names : Nicolas

Status (prof., assistant prof., ...) : Associate professor

Laboratory : Polymers, Biopolymers, Surfaces UMR6270 Website address : pbs.labos.univ-rouen.fr

Institution : Institut National des Sciences Appliquées - Rouen Normandie Website address : http://www.insa-rouen.fr/

Scientific competence of the supervisor:

Polymer and monomer synthesis; materials science; physico-chemical properties

Two major publications in the field proposed for the PhD :

1. F. Fenouillot, A. Rousseau, G. Colomines, R. Saint-Loup, J.-P. Pascault, Progress in Polymer Science, 35, 2010, 578-622
2. G. Stoclet, G. Gobius du Sart, B. Yeniad, S. de Vos, J.M. Lefebvre, Polymer, 72, 2015, 165-176

Website address of the personal page :

Supervisor's email : nicolas.desilles@insa-rouen.fr

Description of the research work proposed for a PhD ***Topic # (see list) :*** IV-10

Title : New bio-based polymers useful in food packaging: synthesis, thermal, mechanical and transport properties.

Subject :

Among the proposed solutions at the Paris climate conference (COP21), one would be to prepare materials made only from renewable resources. This project of thesis will investigate a new generation of bio-based eco-friendly polymers, using molecules obtained from biomass. Indeed, poly(hydroxyalkanoate) (PHA) and poly(lactic acid) (PLA), which are currently used for industrial applications, show mechanical properties often lower than petroleum-based polymers. The preparation of new bio-based materials, semi-crystalline, with high molecular weight and better mechanical properties is therefore scientific, industrial and environmental challenges. For example, isosorbide can be used as a monomer for synthesizing poly (ethylene furanoate) (PEF), which is intended to replace in the future poly (ethylene terephthalate) (PET) for water and soda packaging. Many other polymers can be obtained by green chemistry. The microstructure, the mechanical, thermal, transport and sorption (towards gases and water) properties of these new materials will be studied, to establish relationships between microstructure, morphology, physico-chemical and functional properties.

Keywords :

bio-based polymers, structure-properties relationship

Expected collaborations :

University of Rouen for transport properties

Background required from the applicant :

The project requires strong skills in molecular and macromolecular organic synthesis, and in polymer physico-chemical characterization. The applicant must be fluent in english (or in french).

Existence of a PDF file detailing the proposal ("yes" or "no") : yes

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