

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 : PRUVOST Given names : Sebastien

Status (prof., assistant prof., ...): Professor

Laboratory : IMP Website address : <http://www.imp.cnrs.fr/>

Institution : INSA Lyon Website address : <https://www.insa-lyon.fr/>

Scientific competence of the supervisor:

Materials for energy - Electrical properties of polymers - Structure/properties relationships - thermal conductivity
Co-Supervisor : Sebastien Livi - Ionic Liquids; Polymer materials from ionic liquids; Polymeric ionic liquids; epoxy thermosets; polymer blends, composites and nanocomposites- Structure/properties relationships

Two major publications in the field proposed for the PhD :

1. Electrical, thermal and mechanical properties of poly-etherimide epoxy-diamine blend, N. Halawani, J-L. Augé, H. Morel, O. Gain and S. Pruvost, Composites Part B, 110 (2017) 530-541
2. Ionic Liquids: A New Route for the Design of Epoxy Networks, T.K.L. Nguyen, S. Livi, B.G. Soares, S. Pruvost, J. Duchet-Rumeau and J-F. Gérard, ACS Sustain. Chem. Eng. 4(2), (2016) 481-490

Website address of the personal page :

Supervisor's email : sebastien.pruvost@insa-lyon.fr

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

Title : Design of new innovative materials for improved dielectric properties

Subject :

In the last few years, the scientific community, including academic and industrial research, has put forward unprecedented efforts to develop new functional polymeric materials in terms of water or gas barriers, electrical, mechanical, fire retardancy, or self-healing properties. Very recently, ionic liquids (ILs) that are organic salts have demonstrated their great potential as new components of advanced polymer materials. Moreover, some materials have been developed on the basis of epoxy-thermoplastic systems and the first results obtained have been promising concerning dielectric properties and electrical breakdown

The aim of this PhD is to improve electrical properties of insulating polymer blends tailoring their morphology. It is well known that lamellar or fibrillar structures could affect the dielectric strength depending on its orientation inside the dielectric material. We propose to process first the thermoplastic into fibers and then processing the polymer blend (thermoplastic/thermoplastic blends and thermoplastic/thermoset blends). Controlling the shape of the thermoplastic, its orientation and the processing of the blend, anisotropic properties can be obtained. Ionic liquids will be used as interfacial agents to control the interface or to generate interphase between the two polymers. Morphology-property relationships will be developed to highlight the parameters for the improvement of the electrical properties.

Keywords :

Epoxy systems, thermoset/thermoplastic blends, Ionic liquids, Electrical properties

Expected collaborations :

Background required from the applicant :

The recruited person should have experience in the processing and characterizations of polymer materials. This person will have a master in polymer science (processing and characterizations). Electrical skills (measurements) are a plus. The candidate should be highly attracted by lab work and have high affinity for the setup of novel experiments.

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

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