

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 : LAMNAWAR Given names : khalid

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

Laboratory : Laboratory of Polymer Materials engineering, IMP Website address : www.imp.cnrs.fr; <http://lyon-university.org/>

Institution : University of Lyon, INSA Lyon Website address : www.insa-lyon.fr

Scientific competence of the supervisor:

Supervisors: Khalid LAMNAWAR (Professor-Associate, IMP @INSA de Lyon), Dr. Khalid Lamnawar's research is focused on polymer science, rheology and processing with a dual research dedicated to experimentation and modelling. The main objective is developing some multi-scale studies in micro/nanostructured materials together. He is the author of more than 125 references, including 51 articles in peer-reviewed journals. Thanks to his outstanding contributions, he has been recognized with numbers of awards. He is member of the editorial Board of J. of Composites and Biod. Polymers. He obtained is HDR in 2019 and the excellent Research grant since 2013.

Two major publications in the field proposed for the PhD :

1. Lu B., Lamnawar K.*, Maazouz A., Sudre G. 2018 Critical role of interfacial diffusion and diffuse interphases formed in multi micro-/nanolayered polymer. ACS Applied Materials and Interfaces. 29;10(34):29019-29037
2. H-G.Zhang, K. Lamnawar, A. Maazouz, 2013. Rheological Modeling of the Mutual Diffusion and the Interphase Development for an Asymmetrical Bilayer B Macromolecules Volume: 46 Issue: 1 276-299.

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Supervisor's email : khalid.lamnawar@insa-lyon.fr

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

Title : Interfacial Rheology and dynamic on confined Nanolayered polymers: Fundamental studies towards a better control of interfaces/interphases.

Subject :

The present thesis deals with the Multi-scale Studies of Confined polymers in Nanolayered Structures based on model polymers with tailored interface/interphases properties. The main objectives are to understand the fundamentals of the interfacial phenomena (interfacial reaction, interdiffusion, interfacial slippage as well crystallization) over different length scales. Some innovative interfacial rheological investigation will be developed. The results will offer some new enlightenment for fundamental understanding of layer confinement and the interphases development. Dual experiments and simulations will be performed. Effects of diffusion and/or reaction will be studied. Therefore, it will be exciting task to investigate nanoscale phenomena in term of segmental and chains motions, spanning to interfacial tension and morphology evolutions to macroscopic scale of mechanical/rheological modifications. Overall, based on these finding, the outcome of the thesis should foster development of new rheological models based on some new insights on the tube models adapted for confined polymer's chains. Through both geometrical and macromolecular confinement, a new induced original crystalline morphology (from 2D, to 1D crystal) is expected to be developed.

Keywords :

Polymer science, confinement, Nanolayers, Rheology, Dynamic, interfaces, Structure,

Expected collaborations :

International collaboration: Pr. Joao Maia from the group of Pr. Eric Baer Case Western Reserve University-(CWRU) (CLIPS- CWRU-USA). Also with Dr. Bo Lu, a previous Phd Student of our group.

Background required from the applicant :

Material science and engineering with a good background in chemistry, physics, with good background on Mathematics and mechanics. Candidate with knowledge of rheology, Polymer science are also appreciated.

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

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