

Institut de Recherche Dupuy de Lôme – IRDL UMR CNRS 6027

Pôle Thématique de Recherche « Composites »

Axe de Recherche « Rhéologie »

HISTORIQUE

Créé à l'Université de Bretagne Occidentale, le Laboratoire de Rhéologie EA 940 devient en 2008 l'Equipe Rhéologie du Laboratoire d'Ingénierie des Matériaux de Bretagne – LIMATB EA 4250. En 2016, la fusion du LIMATB avec le Laboratoire Brestois de Mécanique et des Systèmes – LBMS EA 4325 conduit à la création de l'Institut de Recherche Dupuy de Lôme – IRDL UMR CNRS 6027. Les Rhéologues brestois sont intégrés au Pôle Thématique de Recherche « Composites » de l'IRD.

THEMATIQUE DE RECHERCHE

L'axe de Recherche « Rhéologie » du Pôle Thématique de Recherche « Composites » concerne l'étude des relations entre comportements rhéologiques et structures à différentes échelles de milieux complexes. Les matériaux étudiés sont principalement des matériaux polymères ou à matrice polymères, modèles ou industriels, formulés ou naturels.

COMPOSITION DE L'EQUIPE

- Enseignants-Chercheurs
 - Thierry AUBRY, Professeur des Universités, animateur scientifique
 - Jacques HUITRIC, Maître de Conférences HdR
 - François INGREMEAU, Maître de Conférences
 - Pascal MEDERIC, Maître de Conférences HdR
 - Julien VILLE, Maître de Conférences HdR
- ITRF
 - Philippe ROQUEFORT, Technicien de Recherche et de Formation
- POST-DOCTORANTS
 - Laeticia MARTINEZ-CANO (2019-2020)
 - Frédéric BOSSARD (2006-2006)
 - Philippe AGACIAK (2015-2016)
- DOCTORANTS
 - Christophe VONG (2019-...)
 - Fatima FNEICH (2016-2019)
 - Kévin-Jacques LEGOFF (2011-2014)
 - Adeline DUPAS (2009-2012)
 - Julien VILLE (2006-2009)
 - Tolotrahassina RAZAFINIMARO (2001-2005)
 - Rémi WACHE (2001-2004)
 - Emmanuel HEINRICH (1994-1997)
 - Matthieu KERMARREC (2019-...)
 - Quentin BEUGUEL (2012-2015)
 - Hanaya ALDROE (2010-2014)
 - Isabelle LABAUME (2007-2011)
 - Patrice ABIVIN (2004-2007)
 - Ronan JEZEQUEL (2002-2005)
 - Frédéric BOSSARD (1998-2001)
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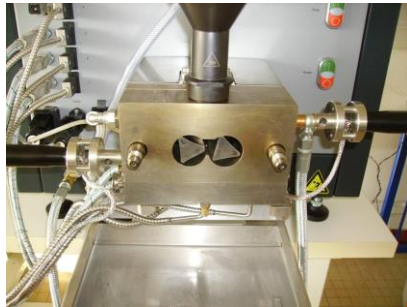
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EQUIPEMENTS

• Matériel d'élaboration et de mise en forme

- 1 mélangeur interne Haake Rheomix 600 (a)
- 1 mini-extrudeuse DSM Xplore (b)
- 1 extrudeuse à filament Filabot Ex 6
- 1 broyeur à couteaux Fritsch, 1 presse à injecter DSM Xplore, 1 presse hydraulique Darragon, 2 étuves Bioblock Scientific



(a)



(b)

• Matériel de caractérisation rhéologique

- 1 rhéomètre Anton Paar MCR 702 MultiDrive (c)
- 2 rhéomètres à déformation imposée : RDAII (d) et ARES
- 2 rhéomètres à contrainte imposée : Gemini Bohlin (e) et Carri-Med CSL 50
- 1 rhéomètre Capillaire RT1000 (f)
- 1 viscosimètre Low-Shear 30 Contraves
- 1 analyseur thermomécanique dynamique (DMTA) VA 4000 (g)



(c)



(d)



(e)



(f)



(g)

PARTENAIRES

- Partenaires institutionnels
 - Brest Métropole
 - Conseil Départemental du Finistère
 - Conseil Régional de Bretagne
 - Conseil Régional des Pays de la Loire
- Partenaires académiques
 - Agence Nationale de la Recherche
 - Ecole Nationale Supérieure des Mines de Paris (CEMEF UMR CNRS 7635)
 - Ecole Polytechnique de Montreal (Canada)
 - ENSI Caen
 - IFREMER
 - INRA Nantes
 - Université de Bretagne Occidentale (CEMCA UMR CNRS 6521, INSERM UMR 1078, Lab-STICC UMR CNRS 6285, LEMAR UMR CNRS 6539, OPTIMAG, ORPHY EA 4324)
 - Université de Laval (Canada)
 - Université de Patras (Grèce)
 - Université de Tours
 - Université de Bretagne Sud
- Partenaires industriels
 - Arkema
 - Direction Générale de l'Armement
 - Enichem
 - Imerys Talc
 - Institut Français du Pétrole et des Energies Nouvelles (IFPEN)
 - Nanovia
 - Polytechs
 - Thermofisher
- Plateformes technologiques
 - Plateau Technique CompositIC (UBS)
 - Plateforme d'Imagerie et de Mesure en Microscopie – Diffraction des Rayons X (UBO)
 - Plateforme Technologique Hyperfréquences, simulation technologie, mesures (UBO)
- Sociétés savantes
 - Groupe Français de Rhéologie
 - Groupe Français d'études et d'application des Polymères

RAYONNEMENT – ORGANISATION DE COLLOQUES

- Congrès Français de Mécanique (Brest, 2019)
- Congrès Annuel du Groupe Français de Rhéologie (Brest, 2018)
- Journées Ouest du Groupe Français d'études et d'application des Polymères (Brest, 2015)
- Journées Ouest du Groupe Français d'études et d'application des Polymères (Brest, 2008)
- Congrès Annuel du Groupe Français de Rhéologie (Brest, 2003)

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PUBLICATIONS SCIENTIFIQUES

- Articles dans des revues internationales à Comité de Lecture

- [1] Rosy GHANEM, Véronique LAURENT, Philippe ROQUEFORT, Tanguy HAUTE, Sophie RAMEL, Tony LE GALL, Thierry AUBRY, Tristan MONTIER, « Optimizations of In Vitro Mucus and Cell Culture Models to Better Predict In Vivo Gene Transfer in Pathological Lung Respiratory Airways: Cystic Fibrosis as an Example », *Pharmaceutics* 13, 47 (2021).
- [2] Fatima FNEICH, Julien VILLE, Bastien SEANTIER, Thierry AUBRY, « Nanocellulose-based foam morphological, mechanical and thermal properties in relation to hydrogel precursor structure and rheology », *Carbohydrate Polymers*, 253, 117233 (2021).
- [3] N. AIT HOCINE, P. MEDERIC, H. HASSAN, « Influence of Long-Term Storage on the Performance of Polyamide_based Nanocomposites : Role of Nanocly Fillers », *Polymer Composites*, 3144-3152 (2020).
- [4] N. AIT HOCINE, P. MEDERIC, H. HASSAN, « Influence of Mixing Energy on the solid-state behavior and clay fraction threshold of PA12/C30B Nanocomposites », *Journal of Polymer Engineering*, 565-572 (2019).
- [5] Fatima FNEICH, Julien VILLE, Bastien SEANTIER, Thierry AUBRY, « Structure and rheology of aqueous suspensions and hydrogels of cellulose nanofibrils: Effect of volume fraction and ionic strength », *Carbohydrate Polymers*, 211, 315-321 (2019).
- [6] T. AUBRY, « An overview on clay-mediated compatibilization of polyethylene/polyamide blends with droplet morphology », *Applied Clay Science* 175, 184-189 (2019).
- [7] Pascal MEDERIC, Fatima FNEICH, Julien VILLE, Thierry AUBRY, « Migration of clay and its role in droplet morphology establishment during melt mixing of clay polyethylene/polyamide nanocomposites », *Applied Clay Science*, 165, 257-263 (2018).
- [8] Jacques HUITRIC, Julien VILLE, Pascal MEDERIC, Thierry AUBRY, « Solid-state mechanical properties of PE/PA blends filled with organoclay or compatibilized by a graft co-polymer: a comparative study », *Polymer Testing*, 70, 208-214 (2018).
- [9] N. FERNEZ, Y. ARBAOUI, A. MAALOUF, A. CHEVALIER, P. AGACIAK, L. BURGNIES, P. QUEFFELEC, V. LAUR, E. LHEURETTE, « Moore's curve structuring of ferromagnetic composite PE/NiFe absorbers », *Journal of Applied Physics*, 123, 084902 (2018).
- [10] F.E.Z. RAHMAOUI, P. MEDERIC, N. AIT HOCINE, A. AIT SAADA, N. POIROT, I. BELAIDI, « Contribution of the organo-montmorillonite/graphene pair to the rheological and mechanical properties of polyethylene matrix based nanocomposites », *Applied Clay Science*, 150, 244-251 (2017).
- [11] Quentin BEUGUEL, Julien VILLE, Jérôme CREPIN-LEBOND, Pascal MEDERIC, Thierry AUBRY, « Influence of formulation on morphology and rheology of polypropylene/polyamide blends filled with nanoclay mineral particles », *Applied Clay Science*, 147, 168-175 (2017).
- [12] X. MICHEL, S. FOUQUAY, G. MICHAUD, F. SIMON, J.-M. BRUSSON, P. ROQUEFORT, T. AUBRY, J.-F. CARPENTIER and S. M. GUILLAUME, « Tuning the Properties of a,w-Bis(trialkoxysilyl) Telechelic Copolyolefins from Ruthenium-Catalyzed Chain-Transfer Ring-Opening Metathesis Polymerization (ROMP) », *Polymer Chemistry*, 8, 1177-1187 (2017).
- [13] Y. ARBAOUI, P. AGACIAK, A. CHEVALIER, V. LAUR, A. MAALOUF, J. VILLE, P. ROQUEFORT, T. AUBRY, P. QUEFFELEC, « 3D printed ferromagnetic composites for microwave applications », *Journal of Materials Science*, 52, 4988-4996 (2017).
- [14] J. HUITRIC, J. VILLE, P. MEDERIC, T. AUBRY, « Solid-state morphology, structure, and tensile properties of Polyethylene/Polyamide/nanoclay blends: effect of clay fraction », *Polymer Testing*, 58, 96-103 (2017).
- [15] Q. BEUGUEL, J. VILLE, J. CREPIN-LEBOND, P. MEDERIC, T. AUBRY, « Influence of clay mineral structure and polyamide polarity on the structural and morphological properties of clay polypropylene/polyamide nanocomposites », *Applied Clay Science*, 135, 253-259 (2017).

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- [16] N. FOLLAIN, B. ALEXANDRE, C. CHAPPEY, L. COLASSE, P. MEDERIC, S. MARAIS, « Physical and barrier properties of polyamide 12/montmorillonite nanocomposites: effect of clay structure and mixing conditions » , *Composite Science and Technology*, 136, 18-28 (2016).
- [17] F. TISSIER, Y. MALLEM, C. GOANVEC, R. DIDIER, T. AUBRY, N. BOURGEOIS, J-C DESFONTIS, M. DUBREUIL, Y. LE GRAND, J. MANSOURATI, K. PICHAVANT-RAFINI, E. PLEE-GAUTIER, P. ROQUEFORT, M. THERON, M. GILARD, « A non-hypocholesterolemic Atorvastatin treatment improves vessel elasticity by acting on elastin composition in WHHL rabbits » ,*Atherosclerosis* 251, 70-77 (2016).
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- [21] Q. BEUGUEL, J. VILLE, J. CREPIN-LEBLOND, P. MEDERIC, T. AUBRY, « Elaboration and Relationships between Structure and Rheological Properties of Microtalc or Nanotalc/Polyamide Composites » , *Journal of Applied Polymer Science*, 132, 31, 42299 (2015).
- [22] Q. BEUGUEL, J. VILLE, J. CREPIN-LEBLOND, P. MEDERIC, T. AUBRY, « Comparative Study of the Structural and Rheological Properties of PA6 and PA12 based Synthetic Talc Nanocomposites » , *Polymer*, 62, 109-117 (2015).
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- [26] N. DECOURCELLE, C. SABOURIN, T. AUBRY, F. GUERARD, « Emulsifying and antioxidant properties of a Shrimp Hydrolysate (*Pandalus borealis*) conjugated with xylose or dextran through the Maillard reaction by dry-heating in mild conditions » ,*Journal of Food Research* 3, 3, 144-157 (2014).
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- [30] I.LABAUME, J. HUITRIC, P. MEDERIC, T. AUBRY, « Structural and rheological properties of different polyamide/polyethylene blends filled with clay nanoparticles : a comparative study » , *Polymer* 54, 3671-3679 (2013).
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