CPR7 "Polymer films and composite for engineering and nanotechnology applications"

Thématiques : Physique et physico-chimie des polymères sous forme de films minces et de nanocomposites.

2020 : Une année ‘Polymère’ et le GFP 50 ans !’

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Lien avec GDR ou autres structures :
GDR Polynano
GDR Bio-ingénierie des Interfaces
GDR Nanoperando
Remisol

Résumé (20 lignes environ)
Many real-world applications in nanotechnology, catalysis, biomedicine, conversion and storage of energy, etc., are linked to employing polymer or composites films. Such films tailor the properties of surfaces and substrates into practical materials and devices, such as biosensors, antifouling coatings, optical storage, patterns, photovoltaic films, medical implants, corrosion protection, lubrication, flexible display devices or even self-cleaning surfaces etc. These numerous applications require different physicochemical properties of polymer films: biocompatibility, responsive behaviour, controlled wettability, adhesion, permeation-barrier behaviour, morphology... Although the use of micrometer thick polymer film is nowadays common, for miniaturized systems their thickness has to be decreased even much further. Polymeric materials are suitable for miniaturization because, in comparison to other materials, polymers often have the advantage of low costs, easy implementation, low weight and rapid fabrication of systems of small dimensions. However, the evolution towards smaller sizes comes at the expense of larger surface to volume ratios. Such material may exhibit thermodynamic, structural, and dynamic properties differing from those of the same material in the bulk.
The goal of this mini conference is to provide a recent overview on Polymer films and composite for engineering and nanotechnology applications through the presentation of recent works concerning:
- New elaboration methods
  High control of the preparation methods are needed to achieve the expected properties: control of the interfaces, of surface morphology and structure...
- New characterization techniques
  Characterization of the interfaces require highly sensitive techniques or the combination of several techniques.
- Fundamental studies focusing on physicochemical properties of polymer films.
  In particular polymers in ultrathin films (h<100 nm) can exhibit unusual physical properties that differ substantially from intrinsic bulk behaviour. As a consequence, we request research works devoted to (but not limited to the effect of confinement on the physical properties.
- Applications: Smart coatings and interaction with the environment
  Smart Materials and Surfaces are designed materials/surfaces that have one or more properties that can be changed in a controlled way by an external stimulus. This behavior is reversible and consequently enables these systems to fulfil actuation and sensing functions
- Study on the stability, ageing and environmental fate
Recently, questions have been raised as to whether the nanocomposites/polymer film are a threat to human health. Studies of their stability and environmental fate is thus needed.

- **Numerical simulation**

To help understanding the unexpected properties of polymeric and composite films numerical simulations can be a powerful tool.

Keeping in mind the interdisciplinary nature of polymer films, contributions from scientists representing a broad range of disciplines are encouraged, including physicists, chemists, chemical engineers, materials scientists, engineers.

De nombreux GDR ou équipes sont concernés par les films et nano-composites à base de polymères :

**GDR** :
GDR Polymères et Océans, GDR Polynano, GDR Bio-ingénierie des Interfaces, GDR Nanoperando, Remisol...

**Equipe de recherche** :
Dans l’Ouest : Institution Photon (Lanion) ; Laboratoire de Biotechnologie et Chimie Marines (Lorient), Institut de la corrosion (Brest), IFREMER, LEMAR (Brest), Institut des sciences chimiques de rennes (Rennes) , Institut d’Électronique et de Télécommunications (Rennes), IMM (Le Mans), IRDL (Lorient), INRA (Nantes), Moltech (Angers), IMN (Nantes)...
National : ICS (Strasbourg), CRPP (Bordeaux), ESPCI (Paris), Lyon, CERMAV (Grenoble)...
Francophone : Allemagne, Belgique...

**Sélection de références des organisateurs sur le sujet de la conférence**


