Dr. Pascal Damman

Pascal Damman was born in Belgium in 1964. He obtained his PhD from the University of Mons-Hainaut in 1992 and moved in 1993 to the Institut Charles Sadron (Strasbourg, France) for a Postdoctoral stay. Since 1995, he is Research Associate of the Belgian National Funds for Scientific Research (FNRS).

Polymer Thin Films Group

Pascal Damman is a member of the Laboratory of Polymer Physical-Chemistry (LPCP), part of the Chemistry Department of the University of Mons-Hainaut (UMH) and of the MateriaNova Research Center. In 2002, he has created a new research group, within the LPCP, specialized in the study of Polymer Thin Films. Thanks to various fundings (FNRS, UMH, RW, European Funds, . . . ) this group involves 8 researchers in 2005 (of whom 4 PhD and 2 Post-Doc).

Our research interests are focused on two main topics: i) Instabilities of ultra-thin films and, ii) self-organization of Polymer surfaces.

Instability of polymer thin films

coll.: G. Reiter (ICSI Mulhouse), E. Raphaël (Collège de France)
Below the critical thickness, any film of fluid becomes unstable and spontaneously dewets on substrates of low surface free energy. For viscoelastic fluids, we showed that dewetting is an outstanding experimental method to study various physical processes such as relaxation in entangled networks (reptation), ageing of glassy polymeric materials, confinement of polymer chains, friction at polymer/polymer interface, adsorption of polymer chains on solid surfaces, . . .

Self-organization of Polymer Surfaces

coll.: R. Lazzaroni (UMH), A. Jonas (UCL), Ch. Jerome (ULg), V. Bayot and S. Melinte (UCL), Y. Geerts (ULB)
We used various physical processes, such as Rubbing and NanoRubbing, dewetting, elasticity effect, flows in micro-channels, . . . to self-organize polymer surfaces, in order to induce chains alignment in domains down to the nanometer scale and/or specific topography. These processes can be coupled to crystallization or chemical surface modification to design organic semiconductor thin films (FET devices), superhydrophobic and super-slippery surfaces, . . .

For additional informations, please contact Pascal Damman (email: pascal.damman@umh.ac.be).

Selected publications:

- **Non linear optical properties and crystalline orientation of 2-methyl-4-nitroaniline layers grown on nanostructured PTFE substrates.**

- **What is the mechanism of oriented crystal growth on rubbed polymer substrates? Topography vs Epitaxy**

- **Dewetting near the glass transition: Transition from a capillary forces dominated to a dissipation dominated regime.**

- **Formation of nanostructured PET thin films from combined surface relaxation and crystallization.**