

Invitation à la soutenance publique de thèse

Pour l'obtention du grade de Docteur en Sciences

Monsieur Roland DUCHÊNE

Master en sciences chimiques à finalité approfondie

Development of Polymeric Materials Containing Palladium-Based Topological bonds

Topological bonds, also called mechanical bonds, are a peculiar class of molecular structures in which their constitutive components are mechanically interlocked. The most common mechanical bonds are catenanes and rotaxanes. They are being used in various fields of research ranging from molecular machines to polymeric materials. The aim of this thesis is to combine polymers and catenanes or rotaxanes in order to create new materials that might exhibit interesting properties.

This thesis is divided into two synthesis-focused projects exploiting the same palladium template to structure the topological bond. The first project focuses on the synthesis of a new type of mechanically-linked block copolymers bearing a palladium-based catenane junction. The long-term goal is to study the influence of a topological bond on the self-assembly properties of block copolymers. A functionalized catenane was first synthesized via a 3+1 ligand approach. Then, using the specific chemical moieties present on its macrocycles, different PEO-cat-PnBA and PEO-cat-PVL were synthesized through successive CuAAC and ATRP or ROP. The second project is devoted to the synthesis of palladium-based slide-ring gels where the mobility of the crosslinks can be controlled. Slide-ring gels are a unique kind of gels possessing mobile crosslinking points providing unusual mechanical and swelling properties. Different strategies were explored in order to synthesize such materials. In the end, slide-ring gels were prepared using a palladium-based pseudo-rotaxane crosslinker which was polymerized with a diisocyanate and PEG. Preliminary rheological studies showed that these gels possess indeed promising mechanical properties but further investigations are needed.

Mardi 29 novembre 2016 à 16h30

Auditoire LAVO 51
Bâtiment Lavoisier
Place Louis Pasteur, 1
1348 Louvain-la-Neuve



Membres du jury :

Prof. Charles-André Fustin (UCL), promoteur
Prof. Jean-François Gohy (UCL), président
Prof. Michael Singleton (UCL), secrétaire
Prof. Olivier Riant (UCL)
Prof. Yves Geerts (ULB)
Dr. Guillaume De Bo (The University of Manchester, UK)