Secteur des Sciences et Technologies

Invitation à la soutenance publique de thèse de

Antonin DESMECHT

Master en Sciences chimiques

Pour l'obtention du grade de Docteur en sciences

« Anionic functionalization of carbon nanotubes and catalytic applications »

qui se déroulera

le mardi 12 novembre 2019 à 16h15

Auditoire LAVO 51

Place Louis Pasteur, 1

1348 Louvain-la-Neuve

Membres du jury :

Prof. Olivier Riant (UCLouvain), supervisor
Prof. Sophie Hermans (UCLouvain), supervisor
Prof. Jean-François Gohy (UCLouvain), chairperson
Prof. Alexandru Vlad (UCLouvain), secretary
Prof. Gwilherm Evano (ULB, Belgium)
Prof. Milo Shaffer (Imperial College London, UK)
Prof. Emilie Genin (Univ. Bordeaux, France)

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By many regards nanocarbons have demonstrated themselves of great interest thanks to their remarkable properties. However, nanocarbons often need to be chemically altered for their process or to tune those properties. Although extensive work has been dedicated to this task during the last two decades, nanocarbon chemistry still lacks reliable, controlled and non-destructive protocols to append exotic and valuable chemical groups.

We propose here the use of the two-step nucleophilic attack of nanocarbons by organolithium reagents, generating anionic and highly reactive intermediates. Those species have been used to trap different electrophiles and immobilize propargylic and boron-based groups on their surface. The covalently linked groups were further used through a series of post-functionalization reactions that enabled the grafting of a wide variety of chemical components.

A fundamental limitation of surface functionalization is the number of anchoring points that can be introduced. By combining our developed methodology with dendrimers, we could significantly enhanced the number of functionalization points in addition to the introduction of new properties brought by the dendrimeric structure.

Finally, we exploited the work described above for the formation of different groups of catalysts, i.e. heterogeneous, homogeneous supported, dendrimer-functionalized or dendrimer-templated catalysts.

We believe that the work presented here brings new and valuable tools for the chemical modification of nanocarbons and their use in various kinds of application but especially in catalysis.