



## **ATIPIC / VITO Technical Meeting**

**Wednesday December 5<sup>th</sup>, 2018**

**2400 Mol**

Both managements of ATIPIC and VITO are pleased to invite you to attend their joint Technical meeting on December 5<sup>th</sup>, 2018, in the **VITO Building in Mol** on the theme

### **" BIO-BASED MATERIALS FOR COATINGS AND INKS"**

In addition to the permanent care to decrease the VOC's in coatings, adhesives and inks for the protection of the environment, sustainability stands out as a strategic target for the development, manufacture and sales of products in compliance with the always more stringent regulations.

More and more bio-based building blocks become parts of polymers used in the products in these sectors.

During this technical meeting the nature, the use of some bio-based raw materials and the performance of the finished products will be highlighted.

#### **Program of the day:**

- 10:00 Welcome, registration
- 10:30 Opening of the technical session
- 13:00 Lunch
- 14:00 Visit of the VITO labs
- 15:30 End of the technical meeting

#### **Venue :**

Conference Room (Foyer)  
VITO NV, Boeretang 200  
2400 MOL



## ATIPIC / VITO Technical Meeting

Wednesday December 5<sup>th</sup>, 2018

2400 Mol

### Technical Program

- 10:30. - Session opening by Dr. J. Warnon – President ATIPIC
- 10:40. - **Bio-based building blocks and resins for coatings.**  
Dr. Jacco van Haveren - *Wageningen University and Research Center*
- 11:15. - **High performance bio-based wall paints. Synthesis, properties and CFP assesment.**  
Dr. Tijs Nabuurs, Maud Kastelijjn – *DSM Coating Resins*
- 11:50. - **Scaling up functionalized bio-based aromatics from sugar derived feedstock.**  
Dr. Paul Könst - Biorizon/TNO
- 12:25. - **Innovative functional materials: from lignin derivatives into polymers.**  
Dr. Richard Vendamme – Biorizon/VITO
- 14:00. - **Visit of VITO Laboratories**



## **ATIPIC / VITO Technical Meeting**

### **Wednesday December 5<sup>th</sup>, 2018**

### **2400 Mol**

#### **Abstracts**

##### **1. Bio-based building blocks for coatings.**

Dr. Jacco van Haveren - *Wageningen University and Research.*

Biobased building blocks derived from biomass offer huge potential to be used in paints and coatings. Well known is the use of unsaturated fatty acids in the construction of alkyd resins for decorative coatings. Challenge is to introduce more biobased building blocks to the coatings industry that have the potential to substitute petrochemical based monomers nowadays used, like e.g. phthalic acid, bis-phenol A based epoxides or acrylics. The presentation will highlight current developments at WUR-Food and Biobased Research with regard to these issues. Focus will be on monomer development with some selected examples of resins synthesised from these monomers.

##### **2. High performance bio-based wall paints. Synthesis, properties and CFP assessment.**

Dr. Tijs Nabuurs, Maud Kastelijn – *DSM Coating Resins*

Several plant-based alternatives to fossil fuel-based (meth)acrylate monomers are already available. Most promising types include the diesters of itaconic acid and esters of (meth)acrylate monomers prepared with plant-based alcohols. Using these monomers in emulsion polymerization can yield water-based, partially plant-based binders showing film properties in industrial coatings that are similar to those found for paints based on commercially available fossil-fuel based binders.

In this paper, we'll show that using dialkyl itaconate esters as biobased building block in emulsion polymerization can deliver binders for wall paints with at least on par performance. Chemical resistance level of the biobased paints is slightly better which is attributed to the slightly more hydrophobic nature of dibutyl itaconate compared to butyl (meth)acrylate.

As a result of the use of the biobased monomers, the carbon footprint of biobased wall paints is significantly better compared to those of fossil fuelbased reference paints.

At this point in time, plant-based contents of between 40 and 50 % can be achieved (calculated on total carbon content). New developments with even higher plant-based contents are, however, foreseen to be available within 5 years from now.

### **3. Scaling up functionalized bio-based aromatics from sugar derived feedstock.**

Dr. Paul Könst - Biorizon/TNO

Biorizon is a Shared Research Center which develops technology for the production of renewable, biobased bulk (BTX) and functionalized aromatics for performance materials, chemicals & coatings. Within Biorizon, TNO is working on technology development of functional and unique bioaromatics from sugars which are derived from 2<sup>nd</sup> generation biomass or waste streams. Novel bio-aromatics HMA and MPA have shown to outperform conventional benzoic acids in applications such as coatings, polyurethane and performance lubricants. At this moment TRL 4-5 facilities are available, enabling continuous production of bio-aromatics at kilogram scale. The business case of functionalized bioaromatics is promising; they are cost-competitive, high performing biobased building blocks. TNO is actively working to bring these bio-aromatics to commercial production. For this purpose, TNO is open for collaboration with value chain partners in the coatings industry, from feedstock to end product.

### **4. Innovative functional materials: from lignin derivatives into polymers.**

Dr. Richard Vendamme – Biorizon/VITO

The synthesis of (semi)aromatic polymers derived from renewable resources is currently attracting tremendous interest from both academia and industry, as the aromatic compounds which are key intermediates in the polymers/chemicals industry are fully derived from fossil resources.

Lignin represents an attractive option for designing sustainable polymers, because it is the most abundant source of renewable aromatic compounds. However, the structural heterogeneity, high polydispersity, and limited compatibility of most technical lignins makes them challenging to use in developing new bio-based polymers.

As an alternative to polymeric lignins, an emerging trend is the use of lower molecular weight lignin derivatives obtained by chemical depolymerisation of lignins. Such lignin-based building blocks could offer several advantages. In fact, lignin bio-oils have additional hydroxyl functionality, are more homogeneous and can lead to higher levels of lignin substitution for non-renewables in polymer formulations. These potential polymer feedstocks however present their own challenges in terms of production (i.e. yields and separation), pre-polymerization reactions and processing.

This talk will provide an overview of the recent developments toward the design of semi-aromatic biopolymers using depolymerized lignins derivatives. Depending on the bio-aromatic substrates obtained from the lignin de-polymerization and separation processes, different chemical modifications and polymerization pathways can be envisaged and developed, leading to (semi)aromatic polymers covering a wide range of industrial applications. The common goal of these strategies is the development of new economically-viable strategies for using lignin as a replacement for petroleum-derived chemicals in aromatic-based polymers. Several examples from our laboratory will be presented.



**ATIPIC / VITO Technical Meeting**  
**Wednesday December 5<sup>th</sup>, 2018**  
**2400 Mol**

**REGISTRATION : ! each participant has to register!**

**Click on : [Fees & Registration Form](#)**

**VENUE :** Conference Room (Foyer), Boeretang 200, 2400 MOL



Route VITO - EN.pdf

**ATIPIC events 2019.**

- February 21<sup>st</sup>      ATIPIC General Assembly (for members only)
- April 3<sup>rd</sup>            NVVT / ATIPIC Study Day
- May 15 or 16<sup>th</sup>      ATIPIC / Materials + Eurofinish 2019
- September 14<sup>th</sup>    ATIPIC Relax (for members only)
- September 26<sup>th</sup>    ATIPIC / BPG Study Afternoon

**ATIPIC Management**

Jacques Warnon, President  
Catherine Dekerckheer, Vice-President  
Eric Mol, Vice-president  
Romain Haegeman, Secretary  
Jean-Marie Cauwe, Treasurer  
Hugues Dedeurwaerder  
Simon Deroover  
Philippe Janssens  
Léo Nagels

[www.atipic.be](http://www.atipic.be)    info@atipic.be  
Avenue E.Grysonlaan,1 – 1070 Bruxelles-Brussel