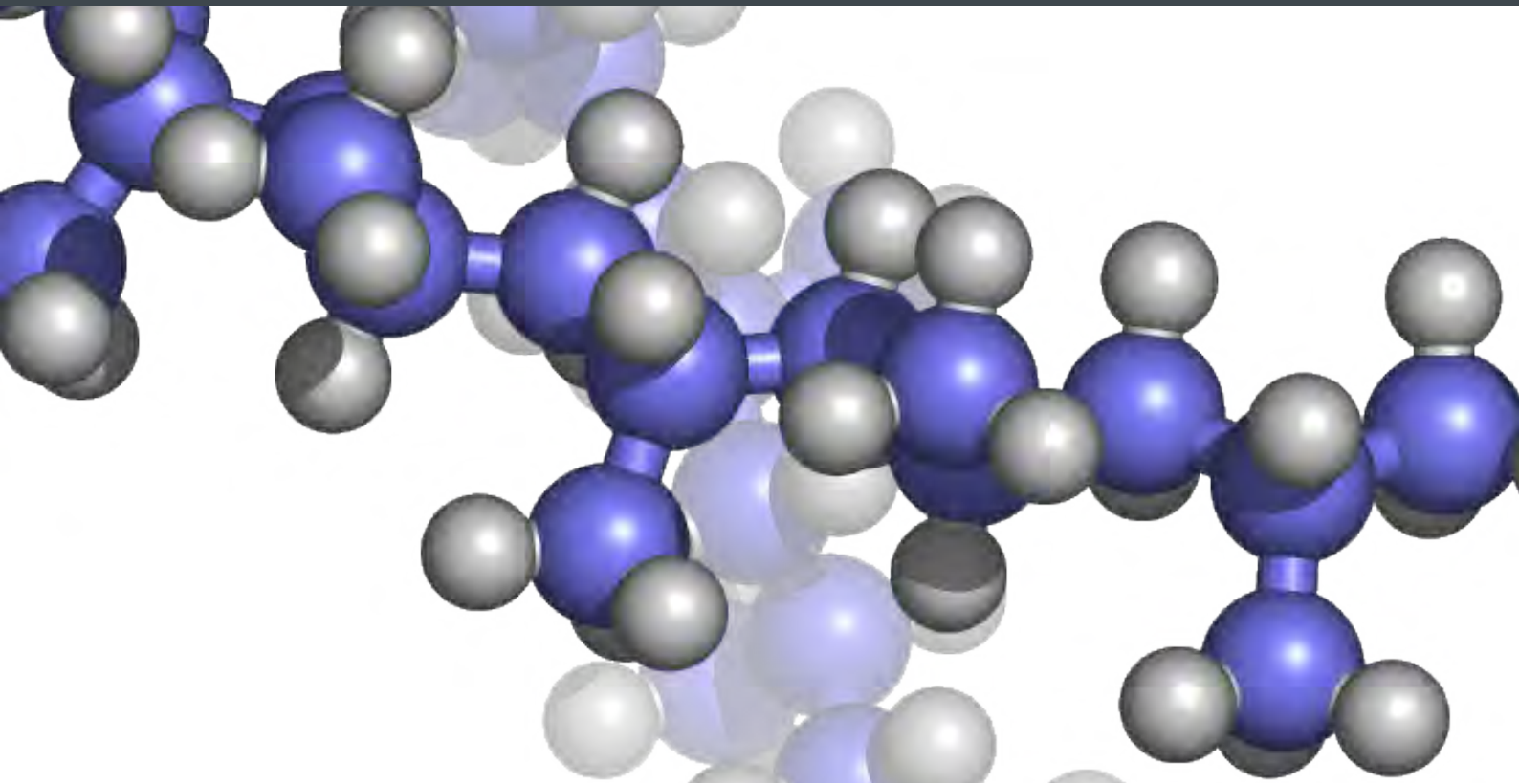




BRUSSELS INJECTION MOLDING SESSIONS 2:

# Understanding mechanical properties of thermoplastics

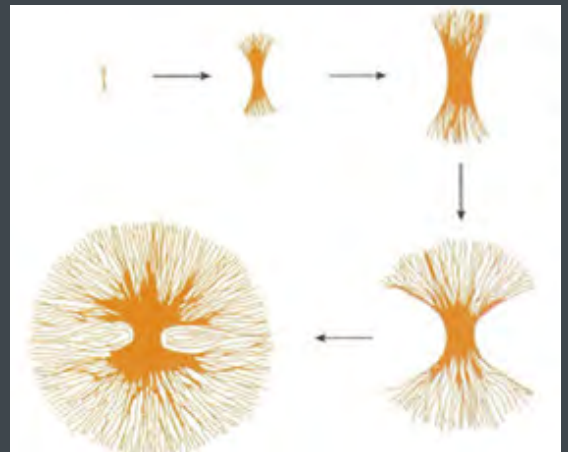
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DETAILS AND IDEA

The seminar's objective is to introduce the participants to the unique and complex field of mechanical response of macro-molecular materials.



## SCOPE

Rather than piling a large amount of information to try to describe the huge diversity of mechanical behavior observed in such materials as amorphous, crystalline, filled or unfilled polymers, the BIMS 2 training session will focus on the fundamental physics behind the phenomena involved in solid state mechanical performance, deformation and failure of polymers and their composites.

This will give the audience a holistic view of the behavior of thermoplastics and will allow them to deepen their knowledge in their preferred fields of interest through additional reading or courses.

The goal of the two day's session is to make sure that all participants leave the course with a much better general knowledge of the field, which will help them to communicate with specialists, material scientists, mechanical designers or CAE experts attempting to predict plastic part performance.

### Participants could be:

\_\_ design or mechanical engineers working with plastics \_\_ molders interested in part performance  
\_\_ professionals interested in plastic part failure mechanisms \_\_ FEA specialists \_\_ project leaders involved in developing plastic parts \_\_ research engineers interested in polymer performance \_\_ material specialists or designers wishing to improve \_\_ their understanding of mechanical performance \_\_ students involved in the field of polymers \_\_ young, skilled professionals with limited experience in the field \_\_ seasoned professionals looking for a fresh view on polymer mechanical performance \_\_ flow analysis specialists wishing to extend their knowledge \_\_ customer support engineers \_\_ scientists ...

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Dr. Vito LEO

More than 30 years experiences in  
polymer processing and physics process.



# REFERENT

Dr. Vito LEO is a physicist by training, and has been working for more than 30 years in the field of polymer processing and physics. He has been particularly active in the field of injection molding of thermoplastics and the use of finite element numerical simulation of this process, and currently works more in the field of mechanical performance of plastics.

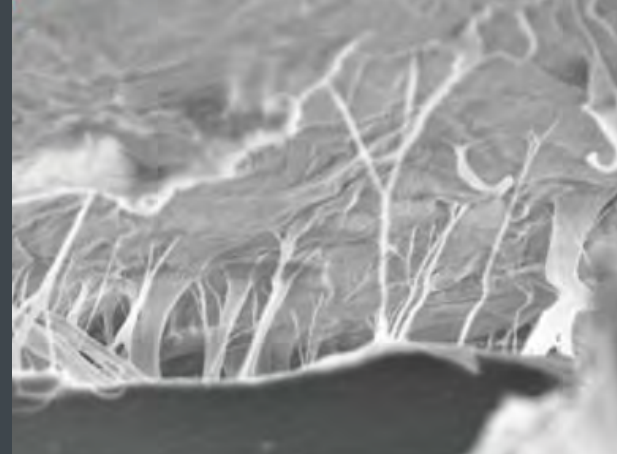
Vito Leo works for the largest chemical company in Belgium supplying the biggest portfolio of engineering polymers and compounds in this industry. He also teaches a second Master's course at Brussels University, to students of the engineering faculty.

Since 2000 he provides training courses for the plastics industry. We appreciate his cooperation with us to organize these seminar sessions exclusively in Germany and thank him very much for his kind assistance.



This seminar will focus on the complex mechanical performance of plastics in order to introduce the key behavior of these unique materials (visco-elasticity, non linearity, creep, impact, failure mechanisms).

The teaching material (over 200 slides) provides an in depth introduction in the field of plastic mechanical performance.



## CONTENT

After attending the seminar, we expect the participants to have a fairly good answer to many typical questions that often come-up when dealing with plastics, like, for instance:

- \_ Why does the modulus of plastics change so much with temperature?
- \_ Why is this change so different from one polymer to another?
- \_ Why do amorphous polymers generally fail in a brittle way in long term tests or impact?
- \_ Why do some still perform quite well in these conditions?
- \_ Why do we have such a thing as a “brittle-ductile” transition in polymers? What is it exactly?
- \_ Why are some polymers ductile at some test rates and brittle at lower as well as higher strain-rates?
- \_ Why is the test “timing” so important for plastics?
- \_ Why does plastic performance change so much with processing conditions, even when unfilled, and even when amorphous?
- \_ Why do polymers “age”? What does this mean and what are the implications on performance?
- \_ What are the mechanisms behind rubber reinforcement?
- \_ Why is the morphology of these blends so critical?
- \_ Why do we need to tailor the formulations to every specific polymer?

The seminar will be highly interactive, with limited attendance, allowing for questions, group discussions and analysis of the attendant problems. Parts or drawings are welcome for open discussion, when possible.

The seminar may not fit the needs of beginners in the field.



# AGENDA

## DAY 1

- 10.00 Welcome  
Stress-strain response of polymers  
Time-temperature effects – Viscoelasticity
- 11.15 Coffee Break
- 11.30 Effects of crystallinity  
3D aspects of the stress field  
Notch effect and stress concentration
- 13.00 Lunch
- 14.00 Craze phenomena in polymers  
ESC – Environmental Stress Cracking  
Fatigue behaviour of polymers
- 15.15 Coffee Break
- 15.30 Creep behaviour of polymers  
Physical ageing of polymers  
UV degradation and moisture effects
- 18.00 End of day 1
- 19.30 Dinner

## DAY 2

- 8.30 Rubber reinforcement  
Effect of flow on toughness
- 10.00 Coffee Break
- 10.15 Fiber filled polymers  
DIGIMAT
- 12.00 Lunch
- 13.00 Residual stresses and weldlines  
Seminar conclusions
- 15.00 End of the seminar

**Remark:** The start times and order of the different chapters are just an orientation. Please be aware that they may change.

Are you interested?

Use the opportunity to better understand mechanical properties of thermoplastics and register now.

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Register via  
[www.simpatec.com](http://www.simpatec.com)

# REGISTRATION

## Registration:

- \_\_ visit the category 'Events' at [www.simpatec.com](http://www.simpatec.com) and sort the events by type (seminars),
- \_\_ choose your convenient BIMS session and
- \_\_ fill out the given registration form.

## Registration fee for BIMS 2:

EUR 1,400.00 + 19% VAT

The fee includes the lessons, training material, food and beverages during both days, and additionally a dinner on the first evening for one person. We appreciate to provide a special early bird discount of 10%. Please check our website for the deadlines.

## Remark:

The seminar will take place with a min. of 8 up to a max. of 25 participants. Please do not forget to timely organize your accomodation by yourself.

## Cancellation:

Cancellations received 30 days or more before the seminar are fully refunded.

For cancellations received less than 30 days but more than 14 days before the seminar, 70 % of the fee payment will be invoiced. No refund for cancellations received later than the 14 days.

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