# FACET

## DACG NEWSLETTER

dutch association for crystal growth
DACG
NVKG
nederlandse vereniging voor kristalgroei

March 10, 2017

issue 1

**FACET**

Newsletter of the Dutch Association for Crystal Growth (DACG), section of the KNCV and the NNV.

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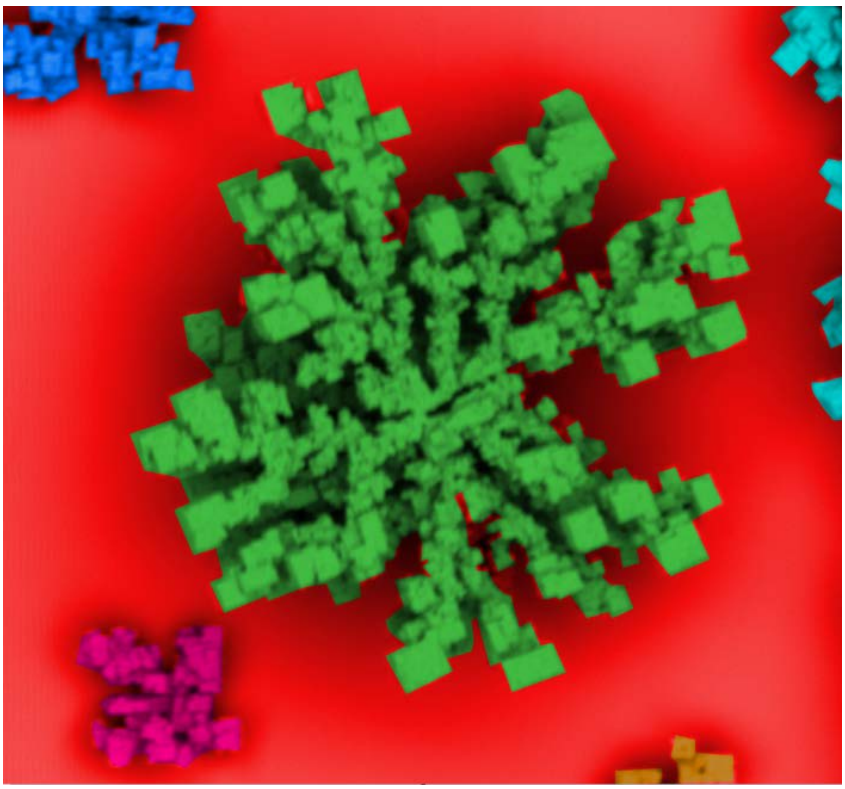

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**DACG Secretary**
prof.dr. Antoine van der Heijden
Leeghwaterstraat 39
2628 CB Delft



**Cover figure**
Pseudo Colored Scanning Electron Microscopy image of sodium chloride crystals grown from an evaporating water/ethanol solution.
The figure is provided by Lian Blijlevens and Ellie Townsend from the Solid state Chemistry group and the Radboud University in Nijmegen.

**From the board**
As you will notice, this first Facet issue of the year is in English. It is not that we forgot how to read and write in Dutch, it is merely a result of the discussion in the annual meeting in Eindhoven last year. As DACG, we would like to provide a platform for all crystal growers in the Netherlands, and not only the Dutch speaking ones. In this way, we would like to take away the language barrier and hope that also our foreign members will enjoy reading the Facet and stay informed about the news of the DACG.

Prof. Antoine van der Heijden, secretary of the DACG, held his inaugural lecture as chair holder at the Delft University of Technology on February 17, 2017. He captured his audience by explaining how he will manage the design of new energetic materials. You will certainly hear more about this topic during the DACG Spring meeting that will be held in Delft ….. on April 7. You can read more about this meeting elsewhere in this Facet.

The DACG board also renewed the connections with the KNCV, the Royal Dutch Chemistry Union. Dr. Frans Koeman, KNCV's coordinator internal relations, was present as a special guest at the last board meeting in Almelo. We have had a lively discussion about what the KNCV can do for us, and what we can do for the KNCV. We also talked about a revival of the Crystal Growth prize. You will hear more about it in a future issue of the Facet.

Furthermore, our network of correspondents is getting in shape. The idea behind this is to get information from all the groups active in the field of crystal growth. Currently we have correspondents at the universities of Delft, Leiden, Wageningen, Nijmegen, Twente, Eindhoven and Amsterdam. Suggestions for correspondents from the missing ones are welcome! The correspondents will provide us with news on the research highlights, conference announcements and visits, and the new PhD theses from their groups. In this first stage of setting up the network, we focused on the academic groups. Next on the agenda is to get connected with our industrial members.

As always, it is easy to contribute to the Facet: Contributions may be delivered by mail, fax, e-mail, or telephone. Your ideas are welcome, please notify the editor (*Arie van Houselt*).

On behalf of the board,
Hans te Nijenhuis

**From the treasurer**
As the DACG is becoming more active, it is also appropriate to start collecting the membership fee again. Therefore, members are requested to pay their DACG membership fee for 2017.

The membership fee is 15 Euro for standard members and 10 Euro for students and members of 65 years and older.

The bank account of the DACG is:

NL60INGB0004305158
(Ned. Ver. Van Kristal Groei)

With kind regards,
Pieter Vonk

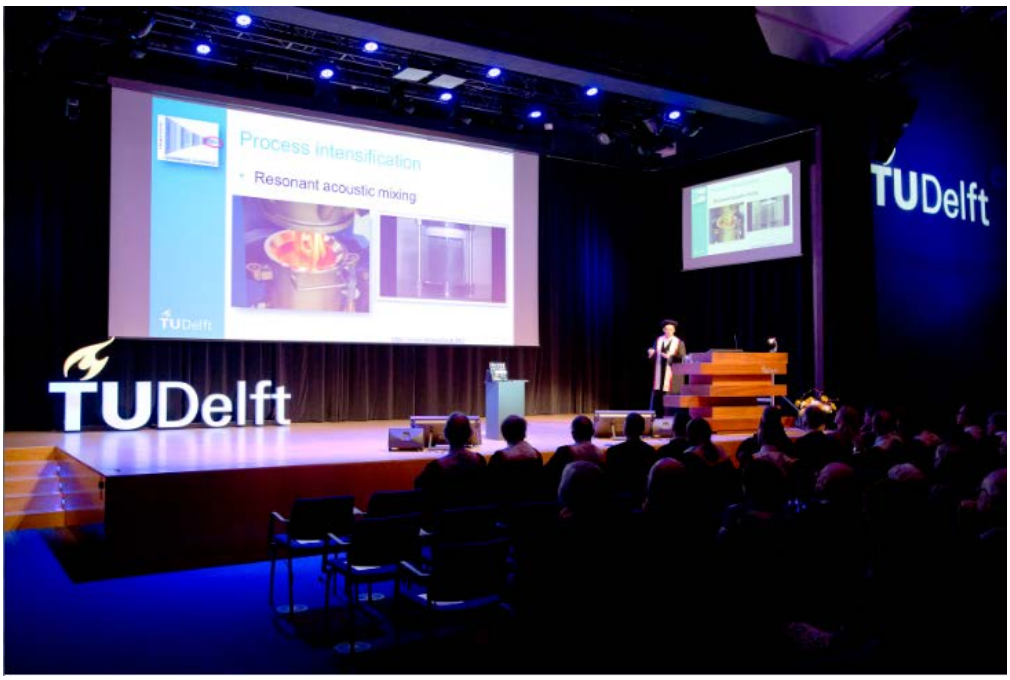
# Inaugural speech “Energetic Materials: from Discovery to Design”

*Inaugural address Antoine van der Heijden: “Energetic Materials: from Discovery to Design”*
On Friday 17 February 2017, professor Antoine van der Heijden, who holds the Functional Design and Processing of Advanced Materials chair at the Department of Process & Energy of the Delft University of Technology, delivered his inaugural speech on designing new energetic materials.

*The choice is gigantic…*
Currently more than 122 million compounds have been officially registered. Only a fraction of them have actually been incorporated into an application, however. The same is true of energetic materials: compounds with stored chemical energy that is released very quickly as a result of ignition or combustion, usually without the need of additional oxygen because it is often already sufficiently present in the compound itself. In the development of energetic materials, high energy content often goes hand in hand with high sensitivity. Many new energetic materials have been discovered in recent decades, but the continued development of a large number of these materials has been terminated because they are too sensitive or too difficult to synthesize, for example. This is why a great deal of research has been conducted to improve energetic materials that are already being used, and in many cases significant progress has been made in reducing their sensitivity.

*Process intensification techniques*
In his inaugural address, Antoine van der Heijden mentioned the expected benefits of process intensification techniques, like the application of external fields (electric, magnetic, electromagnetic and acoustic), to make headway in improving and processing energetic materials that are already being used or which are still in their development phase.

*Models*
A second cornerstone of this chair is the development of models that can predict the properties of energetic materials before actually making them. As a result, spending time and money on a variety of new materials that will ultimately never be used, can be avoided. In the long term, one might even start thinking of designing new energetic materials, based on these models.
For those who could not attend the inaugural address, a recording of the ceremony is available here.



*Audience and lecturer thinking about resonant acoustic mixing.*

# DACG spring symposium 'Crystallization & Process intensification'

For the DACG spring meeting on April 7th, to be held at the TU Delft, the following program has been composed:

10:00 – 10:30 Registration and coffee

10:30 – 10:40 **Welcome and introduction**
Hans te Nijenhuis / Antoine van der Heijden

10:40 – 11:25 **Intensification of crystallization processes; a journey from continuous to batch and back to continuous**
Herman Kramer (Delft University of Technology)

11:25 – 12:50 **The crystalline sponge method, chirality matters!**
Wester de Poel (Radboud University Nijmegen)

12:50 – 12:15 **Microwave-assisted direct nucleation control: temperature cycling for batch crystallization control**
Rohit Kacker (Delft University of Technology)

12:15 – 13:15 Lunch

13:15 – 14:00 **Development of a new ANTI-CAKING agent for salt: MESO TARTRATE**
Jan Meijer (AkzoNobel, Deventer)

14:00 – 14:25 **Real time growth of h-BN: a low energy electron microscopy study**
Adil Acun (University of Twente)

14:25 – 14:40 Coffee break

14:40 – 15:05 **The pathway of ammonium cobalt kambaldaite (ACK) crystal formation revealed by cryogenic transmission microscopy**
Hao Su (TU/e)

15:05 – 15:30 **Influence of surfactants on crystallisation in confinements**
Mohsin Qazi (University of Amsterdam)

15:30 – 15:55 **Process intensification of pharmaceutical crystallization via electric field**
Weiwei Li (Delft University of Technology)

15:55 – 17:00 Drinks, nibbles and lab tour

Venue: TU Delft, P&E Building, Leeghwaterstraat 39, Delft.

For registration visit DACG website.

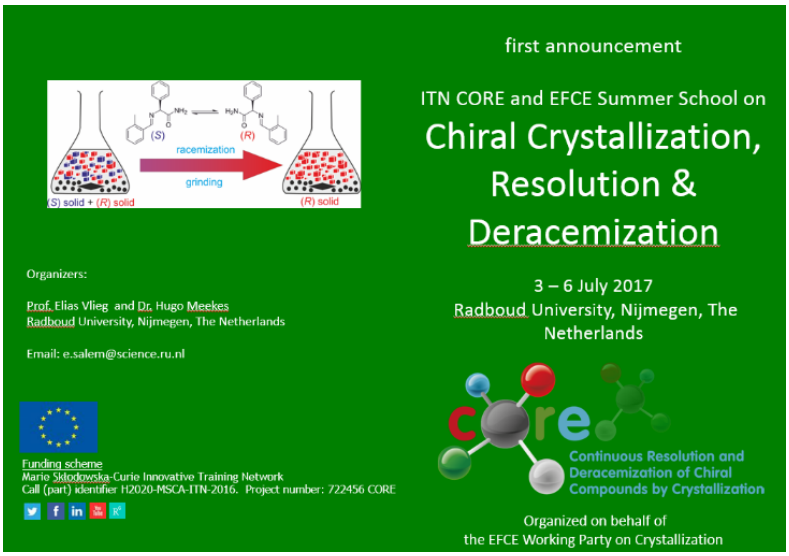
# Announcements

## Gordon Conference

Former DACG chairman Elias Vlieg organizes a Gordon Conference on “Crystal Growth & Assembly”, from 25-30 June 2017.

## Summer school on “chirality, crystallisation, resolution and deracemization”

Elias Vlieg and Hugo Meekes are also organizers of a summer school. The goal of this summer school is to outline the basics of chirality, crystallisation, resolution and deracemization. The school will include a poster session for participants, a lab tour and excursion.




**Program**

The program is not yet complete; topics and speakers will include:

**Introduction to Chirality,**
Prof Elias Vlieg, Radboud University, Netherlands

**Thermodynamics and Phase Diagrams,**
Prof Gerard Coquerel, University of Rouen, France

**Nucleation,**
Prof Joop ter Horst, University of Strathclyde, UK

**Growth Mechanisms,**
Dr. Willem van Enckevort, Radboud University, Netherlands

**Crystallography of Chiral Compounds,**
Dr. René de Gelder, Radboud University, Netherlands

**Processes to separate enantiomers,**
Prof. Andreas Seidel-Morgenstern, Otto-von-Guericke-Universitaet, Germany

**Viedma ripening - experiment and theory,**
Dr. Hugo Meekes, Prof Elias Vlieg, Radboud University, Netherlands

**Registration**

Participants from academia, industry and alike are invited to join. The fee covers the lectures, daily coffee and lunch breaks and the excursion plus school dinner; accommodation is not included.
Registration fee: € 350
Please also check the CORE website for more details.

**Conference venue**

The summer school will be held in the Huygens Building of the Faculty of Science, Radboud University, Nijmegen, The Netherlands

**Organizing Committee**

Prof. Elias Vlieg, Dr. Hugo Meekes, Mrs. Elizabeth Salem

**Contact**: Questions and comments are welcome. Please contact e.salem@science.ru.nl

# Recent publications

- F. Anisi, K.M. Thomas and H.J.M. Kramer, *Membrane-assisted crystallization: Membrane characterization, modelling and experiments*, Chemical Engineering Science 158 (2017) 277-286

- M.A. Reus, G.A. Krintiras, G.D. Stefanidis, J.H. ter Horst and A.E.D.M. van der Heijden, *Immobilization of gluten in spherical matrices of food-grade hydrogels*, Journal of Food Process Engineering 2017, article in press

- P. Bampoulis, V.J. Teernstra, D. Lohse, H.J.W. Zandvliet and B. Poelsema, *Hydrophobic ice confined between graphene and $MoS_2$*, Journal of Physical Chemistry C, 120 (2016) 27079

- Q. Yao, R. van Bremen and H.J.W. Zandvliet, *Growth of silicon on tungsten diselenide*, Applied Physics Letters 109 (2016) 243105

- B. Poelsema, M.S. Altman, R. van Gastel H.J.W. Zandvliet and A. van Houselt, *Ordinary and supernumerary resonant scattering of low energy electrons from the $BiCu_2$(111) surface alloy*, New Journal of Physics, 19 (2017), 013024

- E. Grothe, H. Meekes and R. de Gelder, *Searching for Stereoisomerism in Crystallographic Databases: Algorithm, Analysis, and Chiral Curiosities*, Acta Cryst. B, article in press

- R.H. van Leest, P. Mulder, G.J. Bauhuis, H. Cheun, H. Lee, W. Yoon, R. van der Heijden, E. Bongers, E. Vlieg, J.J. Schermer, *Metal diffusion barriers for GaAs solar cells*, Phys. Chem. Chem. Phys., article in press