

Arvoisa Katalyysiseuran jäsen! Dear member of Catalysis Society!

Can catalysis save the world?

We have heard recently bad news regarding the status of our globe. Intergovernmental Panel on Climate Change (IPCC) states in their recent Special Report (SR15) that the global warming should possibly be limited below 1.5 degrees or otherwise dramatic influences of the warming will be seen. It is clear that predicting future is challenging but it is also evident that remarkable actions are needed to mitigate the climate change. Another topical global environmental challenge is plastic waste. Waste streams of plastics seem to cause growing problems, especially particles of microplastics and other waste plastics in seas. However, I think that plastics are better products from the environmental point of view than their reputation. For example, as materials with long lifetime they are excellent to bound carbon. Therefore, the plastics themselves are not our most serious problem but we should only keep them in the circulation as well as possible. Moreover, in parallel, we should develop new routes to produce plastics and alternative materials to plastics from sustainable raw materials such as biomass and carbon dioxide.

Electrification of transport and industry has been proposed to be a solution for the decarbonization of these sectors. However, all the transport cannot be directly decarbonized e.g. for aviation and marine transport, liquid and gaseous fuels are still needed for undetermined time in the future. The same is

valid for the industry: all the energy demand by industrial processes cannot be provided by electricity or electric energy is not suitable for these processes. If assuming that fossil fuels will be phased out, our option is to produce liquid and gaseous fuels for the transportation either from biomass or by utilizing carbon dioxide. Carbon dioxide utilization for fuels can be understood as an indirect electrification of the transport, since energy for these fuels (electrofuels) is not provided by carbon dioxide but by hydrogen which is produced by water electrolysis applying (low carbon) electricity. All in all, in many potential routes from biomass to high quality transportation fuels including e.g. gasification and pyrolysis, there are catalytic purification or upgrading steps i.e. catalysis is a necessity for the production of these biofuels. In the production of electrofuels (methane, methanol, Fischer-Tropsch paraffins) catalysts are even more necessary since we won't see just any desired reactions without catalysts. These reactions are based on the hydrogenation of either carbon dioxide, carbon monoxide or both (carbon monoxide is obtained by reverse water-gas shift reaction of carbon dioxide and hydrogen) where hydrogen has to be activated on the catalyst surface as a prerequisite for the reaction.

Catalysis can also play a role in solving our plastics problem. It is clear that the most of the plastics waste should be recycled. Mechanical recycling is then the first option but chemical recycling is also needed since all the plastic waste does not fulfil the criteria

Katse



Suomen katalyyttiseura
Finska katalytsällskapet
Finnish Catalysis Society

JÄSENKIRJE 2/2018

for the mechanical recycling. In chemical recycling, plastic is typically decomposed again to liquid (pyrolysis/thermolysis) or gaseous form (gasification). Especially in plastics pyrolysis, catalysts can be used to enhance the conversion or selectivity to desired products. On the other hand, syngas formed in gasification can be upgraded catalytically to olefins being important intermediates to many plastics and other base and specialty chemicals. A similar kind of approach as for syngas, can be applied for carbon dioxide as a raw material for plastics.

I think that catalysis cannot save the world alone but it is very essential tool to reach important climate and circular economy targets. However, we do not have any ready-made solutions for these problems and thus remarkable academic and industrial catalyst research and development efforts are still needed.

I wish you all happy coming Christmas holiday season!

Juha Lehtonen
Chairman

Berzelius Prize for Professor Riikka Puurunen

The Swedish Catalysis Society presented the prize to Professor Puurunen in Copenhagen on 27 August 2018.



Photo: Mika Huuhtanen

The Berzelius Medal is given in the honour of the famous Swedish researcher Berzelius. The prize winner has to be aged under 45 years, female every second time and working in a Nordic country. Each country can come up with one proposal. Professor Puurunen was proposed by the Finnish Catalysis Society.

The candidate should have performed research in the field of catalysis and her/his

work should have generate a new concept, idea or explanation; a new way to tackle a scientific problem; or an introduction of a new word or phrase that is significant. Candidates are evaluated by 4 international experts (2 female, 2 male) who will make an evaluation report on them.

"I feel extremely grateful and honoured to receive the Berzelius Prize. The prize is a great recognition for my persistent and on-going work to understand the details of atomic layer deposition (ALD). ALD is a technology which was awarded Millennium Technology Prize 2018 and whose importance is growing in the field of catalysis, too," says Professor Puurunen.

Professor Puurunen received the prize at the 18th Nordic Symposium on Catalysis. The event is organized every other year and its aim is to create a breeding ground for ideas by ensuring meetings between researchers and catalyst developers, from academy as well as industry, within all aspects of catalysis within the Nordic Countries.

Original text: Aalto CHEM news

EFCATS young scientist challenge

The European federation of catalytic societies once again acted on the future challenges that will preserve European industry competitive and even more, leading player in industry that utilizes catalysis as one of the caring pylons of production. Importance of any action in this field can be stressed with the fact that 90 % of all the goods founded on the todays market were in contact with catalysts, in one way or another. Every interaction between young chemists and chemical engineers is a

small drop in lake that eventually can grow into a big wave, therefore all the investments in this are highly desired and necessary.

Related to this, the EFCATS for the first time organised Young Scientists Challenge hosted by Wageningen university from 9th – 11th July 2018. EFCATS unite 25 National European Catalysis Societies out of which 17 toked a part in the challenge with 30 students. Each country contributed with maximum two young researchers (PhD students or recently graduated). Event was organised in a way to stimulate team work. At the very beginning of the challenge five members teams were formed from the participants each from different country and with different scientific background. Thus, extremely heterogeneous groups were made to work together and rely on each other. All the teams shared the same task, to create and present research proposals, either fundamental or applied, which may contribute to securing the sustainable delivery of food/feed/fuels/materials for our future society. In tight timeframe, each team had to deliver full 12 pages research proposal of the study where 3 PhD students would contribute to common goal, each from their own perspective. Beside the scientific aspect of proposal, practical application trough the hosting institutions, laboratories and existing know how was considered, as well as economical estimations. This was extremely hard task to be done in one and a half day and only mutual understanding and hard teamwork made it possible. On the excitement of all participants and organising committee truly interesting proposals were developed, such as biomass conversion into furfural and BTX, or combined concepts of catalytic, photo- and electrochemistry towards conversion of CO₂ into DME and methanol.

Katse



Suomen katalyyttiseura
Finska katalytsällskapet
Finnish Catalysis Society

JÄSENKIRJE 2/2018



At the end advisory board consisting of EFCATS board members: Prof. Angeliki Lemonidou, Prof. Justin Hargreaves, Prof. Bert Weckhuysen and Prof. Harry Bitter had a hard time to award the most promising concepts. The final decision was made after presentations and open discussion that every team had to provide. The winning teams were:

- 1st prize (500 Euros each): Kasun Guanasoorya (Belgium), Katarzyna Adamska (Poland), Lars Kiewidt (The Netherlands), Mirtha Alejandra (Portugal) and Eleni Bletsas (Greece)
- 2nd Prize (200 Euros each): Jaroslav Kocik (Czech Republic), Susana Guadix-Montero (UK), Ilker Tezsevin (Turkey), Vera Truttmann (Austria) and Anna Winiwarter (Denmark)
- 3rd Prize (100 Euros each): Valeryia Kasneryk (Czech Republic), Hanna Karlsson (Sweden), Nemanja Vucetic (Finland), Matteo Signorile (Italy), Kristoffer Hauberg Rasmussen (Denmark)

In these 3 days beside the scientific discussions young researchers had a chance to interact and get to know each other, promising ideas were developed and what is most important they are still developing. High motivation that almost each participant brought to the picture removes all the fears for the future.

I am deeply grateful to the EFCATS for giving us this event and I am putting my hopes that it will become an annual event that will connect new generations of scientists. Next to it I am thankful to the Finnish Catalysis Society for choosing me together with Dr. Ricardo Pezoa Conte to represent Finland in the contest, allowing us to contribute and gain extremely valuable experiences and ideas.

Sincerely yours,
MSc Nemanja Vucetic

18th Nordic Symposium on Catalysis

August 26-28, 2018 Copenhagen, Denmark

The 18th Nordic Symposium on Catalysis was organized at IDA conference centre in the house of The Danish Society of Engineers and was held on August 26-28th 2018. During the conference catalysis was covered broadly by 3 plenary lectures, which included the 2018 Berzelius award lecture, 4 Nordic keynote talks, 51 oral presentations and 49 poster presentations.

The winner of the 2018 Berzelius Price was Professor Riikka Puurunen from Aalto University. Her inspirational and captivating lecture was titled "Supported heterogeneous catalysts by atomic layer deposition". Other plenary speakers were Professor Emiel Hensen from Eindhoven University of Technology with the lecture "Valorization of lignocellulosic biomass: from catalytic chemistry to novel processes" and Professor Jan-Dierk Grunwaldt from Karlsruhe Institute of Technology with the lecture "Catalysts and reactors under dynamic reaction conditions in environmental catalysis and for energy storage and conversion". Nordic keynote talks were given by Christian Hulteberg, from Lund University, Sweden with the title "Heterogeneous catalysis - from research to industrial implementation", Jia Yang from Norwegian University of Science and Technology with the title "Isotopic labeling for kinetic and mechanistic investigation in Fischer-Tropsch synthesis", Ulla Lassi from University of Oulu, Finland with the title "Biomass-based carbon catalysts in catalytic conversion reactions" and Peter Christian Kjærgaard Vesborg from Technical University of Denmark with the title "Ultrasensitive measurements of transient electrocatalytic phenomena".



The Berzelius award lecture about "Supported heterogeneous catalysts by atomic layer deposition" from Prof. in Aalto University – Riikka Puurunen



Keynote talk about biomass-based carbon catalysts from Prof. in University of Oulu – Ulla Lassi

The Finnish Catalysis Society granted six participants from Finnish universities, namely Riikka Juhola (University of Oulu), Tiia Viinikainen (Aalto University), Aitor Arandia (Aalto University), Minttu Kauppinen (University of Jyväskylä), Ekaterina Kholkina (Åbo Akademi University) and Katja Lappalainen (University of Oulu/Kokkola University Consortium Chydenius) to give poster and oral presentations in different interesting topics within the field of catalysis. The presenters covered topics focused e.g. on the computational modeling related to catalysis, the synthesis of the catalytic

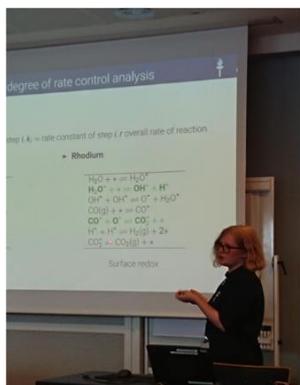
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Suomen katalyysiseura
Finska katalyysällskapet
Finnish Catalysis Society

JÄSENKIRJE 2/2018

materials as well as the evaluation of catalytic properties where catalysts can be applied into different applications such as water purification, biomass conversion into platform chemicals etc. As a result, the presenters gave an overview of the activities, which young researchers are carrying out in Finland on the field of catalysis.



Left: Oral presentation about Minttu's, and right: poster presentation about Riikka's PhD thesis results

Besides excellent scientific program, the conference offered great social program and good food ☺. The conference venue was perfectly located by the canal offering an amazing view to the beautiful city of Copenhagen. The nice venue inspired lively conversations amongst the participants about the topics within and outside the field of research.



Great food was served during the conference

Overall the conference trip was a great opportunity to hear what is the current status of catalysis research in Northern Europe and also to interact and network with researchers and students. It was most inspiring to listen to wonderful presentations as well as to talk with researchers who have passion for their work. The conference also enabled planning of future projects with new collaborations.

We would like to thank the Finnish Catalysis Society for providing financial assistance for this trip!

Katja Lappalainen, Riikka Juhola, Tiia Viinikainen, Aitor Arandia, Minttu Kauppinen and Ekaterina Kholkina



Conference dinner

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Finnish Catalysis Society

JÄSENKIRJE 2/2018

Suomen katalyyttiseuran viides väitöskirjapalkinto

Hakuaika 10.12.2018-15.1.2019

Suomen Katalyyttiseura julistaa haettavaksi väitöskirjapalkinnon, joka annetaan suomalaisessa yliopistossa tai tutkimuslaitoksessa hyväksytystä innovatiivisesta ja tieteellisesti korkeatasoisesta väitöskirjasta. Väitöskirjapalkinnon tarkoituksena on edistää suomalaisen katalyyttitutkimuksen näkyvyyttä ja tunnettua. Palkinto kattaa kaikki katalyyttin osa-alueet: heterogeenisen, homogeenisen ja biokatalyyttin. Palkinnon suuruus on 2000 euroa.

Väitöskirjapalkinto myönnetään joka kolmas vuosi, ensimmäisen kerran palkinto jaettiin vuonna 2007 (David Kubicka, ÅA), toisen kerran 2010 (Pasi Virtanen, ÅA), kolmannen kerran 2013 (Viljami Pore, HU) ja neljännen kerran 2016 (Marko Melander, Aalto). Väitöskirjan tulee olla valmistunut hakuaikaa edeltävän kolmen vuoden aikana (1.1.2016–31.12.2018), ja sen on oltava väitöstilaisuudessa hyväksytty viimeistään 31.12.2018.

Väitöspalkintoa myönnettäessä huomioidaan seuraavat seikat: väitöskirjan tieteellinen taso ja arvosana, tutkimustyön uutuusarvo, sekä tutkimusaiheen ajankohtaisuus. Erityisesti halutaan suosia töitä, joiden tulokset on julkaistu tai hyväksytty julkaistavaksi korkeatasoisissa kansainvälisissä julkaisusarjoissa. Työ voi olla perus- tai soveltavaa tutkimusta. Palkinnon saaja voi olla suomalaisessa yliopistossa tai korkeakoulussa väitellyt suomalainen tai ulkomaalainen tutkija. Palkinnon saajalla ei ole ikärajaa.

Palkintoehdotuksia voivat tehdä yksittäiset tutkijat tai tutkimusyhteisöt, ei kuitenkaan väitöstyön tekijä itse. Ehdotukseen tulee liittää väitöskirja, sekä vastaväittäjien ja ennakkotarkastajien lausunnot.

Palkintoehdotukset osoitetaan Suomen Katalyyttiseuralle. Seuran hallitus suorittaa alkukarsinnan ja valitsee parhaat työt finaaliin lähetettäväksi yhdelle ulkopuoliselle asiantuntijalle, joka valitsee palkinnon saajan. Seuran hallitus nimeää ko. asiantuntijan, joka ei ole suomalaisen tiedeyhteisön jäsen. Finaaliin päässeille väitöskirjoille annetaan kunniamaininta.

Palkintoehdotukset voi toimittaa osoitteeseen:

Suomen Katalyyttiseuran pj
Tutkimusprof. Juha Lehtonen
Teknologian tutkimuskeskus VTT
Tietotie 4C
PL 1000
FI-02044 VTT
s-posti: juha.lehtonen@vtt.fi

The fifth Doctoral thesis award of the Finnish Catalysis Society

**Application period December 10, 2018 –
January 15, 2019**

The Finnish Catalysis Society invites nominations for the Best Doctoral Thesis Award, which is given to an innovative and high quality Doctoral Thesis accepted in a Finnish university or research institute. The purpose of the award is to increase the visibility of the Finnish catalysis research. The award covers all aspects of catalysis: heterogeneous, homogeneous and biocatalysis. The award is worth 2000 €.

Katse



Suomen katalyysiseura
Finska katalyysällskapet
Finnish Catalysis Society

JÄSENKIRJE 2/2018

The award is given every third year and was given for the first time in 2007 (David Kubicka, ÅA), second time 2010 (Pasi Virtanen, ÅA), third time 2013 (Viljami Pore, HU) and fourth time 2016 (Marko Melander, Aalto). The nominated theses must have been finalized during the three years preceding the application period (between January 1, 2016 and December 31, 2018) and they must have been accepted in a thesis defense no later than December 31, 2018.

The following points will be considered when choosing the winner: scientific quality and mark of the thesis, novelty of the research and topicality of the research area. Especially those works, which have results that have been published or have been accepted for publication in high-quality international journals, will be favored. The work can be of fundamental or of applied nature. The receiver of the award can be Finnish or foreign researcher who has defended his/her doctoral thesis in a Finnish University. There is no age limit for the award receiver.

Candidates for the award may be nominated by individual researchers or by research groups, but not by the candidate him/herself. The suggestion must include the doctoral thesis and statements by the opponent and the pre-examiners. The nominations are addressed to the Finnish Catalysis Society. The board of the Society will make a preliminary selection and choose the final candidates to be sent to an external expert who will choose the winner of the award. The board of the Society will nominate this expert who is not a member of the Finnish science community. An honorable mention will be given to all theses that have reached the final.

Suggestions for the receiver of the award can be sent to:

Chairman of the Board of the Finnish Catalysis Society
Research Prof. Juha Lehtonen
VTT Technical Research Centre of Finland
Tietotie 4C
P.O.Box 1000
FI-02044 VTT
e-mail: juha.lehtonen@vtt.fi

Welcome to the 4th Finnish Young Scientist Forum on Catalysis!

The 4th Finnish Young Scientist Forum will be organized in Oulu on April 5, 2019, in connection with the Annual meeting of the Finnish Catalysis Society.

In the one-day event, doctoral students and companies are invited to present their research in oral talks and short announcements. Contributions from all sub-fields of catalysis are very welcome: homogeneous, heterogeneous, enzymatic, and polymer catalysis; presentations covering aspects from theoretical chemistry to material science and chemical engineering.

After the symposium, the annual meeting of Finnish Catalysis Society will take place.

Save the date already now in your calendars.

More info will be come at the websites of the Finnish Catalysis Society
<http://www.katalyysiseura.org/>

and the University of Oulu/Environmental and Chemical Engineering
www.oulu.fi/environmentalengineering/

Summary feedback from the 3rd Young Scientist Forum for Catalysis

by Riikka Puurunen

The feedback questionnaire related to FYSFC2018 event, shared in Katse 1/2018 ([link](#)) with the goal to develop the event further for next year, received fifteen responses. Warmest thanks for everyone who responded! Summary of the feedback is shown below.

What did you like? (as provided)

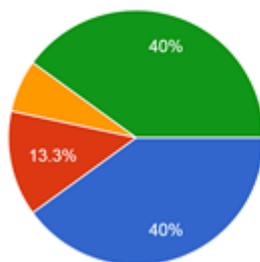
- The event was very well organized. Speeches stayed on schedule.
- Erittäin hyvin järjestetty tapahtuma. Erityisesti plenary oli ajatuksia herättävä. Erittäin hyvä, että opiskelijoille tarjotaan mahdollisuutta harjoitella suullisten esitysten pitämistä. Ruoka oli hyvää ja sopivasti ajoitettu.
- The plenary lecture was of a high-quality. It was nice to connect and network.
- Plenary talk was excellent. Event was planned and organized very well.
- Especially impressed by how well the schedule was adhered to.
- The plenary lectures were very interesting and height level
- It went smoothly. I did learn new and useful things.
- Aikataulu oli tiukka, joten oli hyvä, että sovitusta ajoista pidettiin kiinni. Foorumi pidettiin todella kauniissa ympäristössä!
- The event had clear structure, the timing of presentations was well kept, information before the event was sufficient, possibility to network

Development ideas (merged)

- Poster session was organized for the first time in 2018. Numeric feedback on it was overall positive, taking into account this was the first time a poster session was organized. As development ideas, more time would be needed overall to have a look at the posters. Also, it was suggested that for each poster, an oral pitch would be included.
- As usual, people call for time to mingle around during coffee break(s).
- One view: "Even though this is young scientist forum, I would really wish to have senior scientist forum as well. Not so much about specific studies, but more about what our catalyst experts who have more than 30 years of experience each could teach us about process development, business development, creating consortiums, networking, project proposals etc. and of course some practical "post mortem" studies: what we did right, what was not so successful."

Did you present at FYSFC2018?

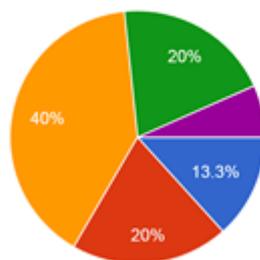
15 responses



- Yes, I had a talk
- Yes, I had a poster with pitch talk
- Yes, I had a poster (without pitch talk)
- No, I did not present

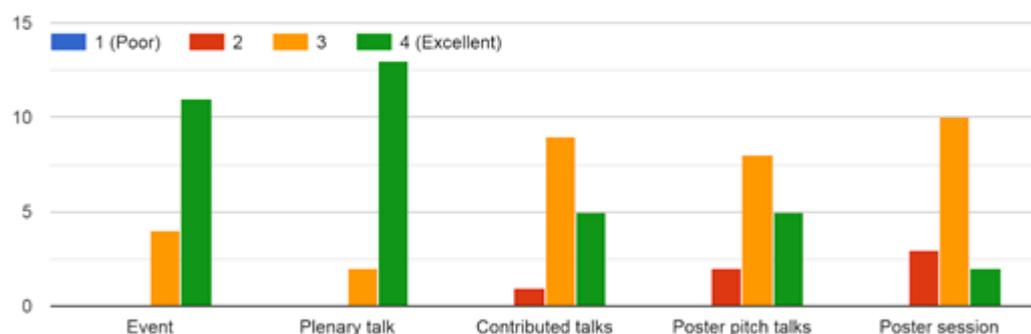
Were you at the previous FYSFC meetings in Tampere or Jyväskylä?

15 responses



- Only Tampere 2016
- Only Jyväskylä 2017
- Both Tampere 2016 and Jyväskylä 2017
- This was my first FYSFC meeting
- I have not been at the FYSFC meetings but I wish to answer the survey anyway

Your overall evaluation of the following sections



Conferences and symposia

14th EuropaCat – European Congress on Catalysis “Catalysis without borders”
August, 18-23, 2019, Aachen, Germany
www.europacat2019.eu

Prof. Yongdan Li will organize a pre-conference of EuropaCat in 2019, with title “**Workshop on Catalytic Reactions with Ion Transfer through Interfaces**”.

The topics will cover the following:

1. Catalysis and ion transfer in photo-stimulated reactions
2. Catalysis and ion transfer in fuel cells
3. Catalysis and interfacial steps in metallic batteries
4. Coupling of catalysis and membrane processes
5. Interfacial steps in other energy storage devices
6. Hydrogen and ammonia as the energy carrier

Webpage: <https://www.aalto.fi/iticat2019>

Web pages

<http://www.katalyyttiseura.org>

<http://www.kemianseura.fi>

<http://www.efcats.org>



International Congress on Catalysis for Biorefineries
www.catbior2019.fi

The organizing committee cordially invites you to attend the 5th International Congress on Catalysis for Biorefineries, which will be held September 23 – 27, 2019 in Turku/Åbo. The 1st Catbior originated in 2011 in Malaga (Spain). Since then, the congress alternates worldwide in odd years: the 2nd congress was held in Dalian (China) in 2013 followed by congresses in Rio de Janeiro (Brazil) in 2015 and Lyon (France) in 2017.

The global conference covers all aspects of application of catalysis on biorefineries, particularly

- Fundamental and applied catalysis in biorefinery
- Molecular insights in processing of biomass
- Utilization of lignocellulosic, algal biomass, vegetable oils and other biomass
- Industrial demonstrations
- Catalysis in its variety – homogeneous, enzymatic and heterogeneous catalysis

Information about the conference can be obtained from the website www.catbior2019.fi Abstract submission starts in January 2019!

6th European Conference on Environmental Applications of Advanced Oxidation Processes (EAAOP-6), June, 26-30, 2019, Portorož-Portorose, Slovenia
<http://eaaop6.ki.si/>

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