

BIOVALUE SPIR

Bio-Value Newsletter

November 2014 No. 12 A reminder to sign up for the international seminar and invite your most relevant guests, media attention to Vitalys, and a resumé of the scientific publication from Project 5 on the effect of tin (Sn) on the synthesis of an interesting catalyst for biomass conversions.

Platform news

Remember to sign up for the international seminar

There are still seats available for the BioValue's one-day seminar on biorefinery on 4th of December 2014. Take this unique opportunity to meet experts in biorefinery value chains from UK, USA, NL, and France. **Make sure to invite the company or academic partner you think could be interesting for your project!!!** For that purpose a pdf-one pager of the invitation is also attached to this newsletter.

Register at <http://biovalue.dk/biovalue-international-seminar/>

Deadline for SME-project applications

The board will review SME-application on their meeting in December and the deadline for submitting applications to Anders Iversen, aiv@agrotech.dk is 17th of November. For best results, make sure your application is coordinated with the SME-administrators and an appropriate Competence Center Leader. Application forms can be requested by emailing Anders Iversen.

Vitalys in the media for participating in BioValue

Different journals picked up a BioValue press release regarding the purpose for Vitalys to work with lysine production from biomass instead of refined sugar. The articles can be read on the website: <http://biovalue.dk/vitalys-will-cut-sugar/> or found on the page for Project 4. If your project wants to reach the media with a story, contact the BioValue office and we will make it happen (lindedam@biovalue.dk)

Invitation to Bioeconomy – Potentials for new Growth

State of Green and Danish Agriculture & Food Council is hosting a conference including business cases on innovation and export of bio economy based products, representing Danish Fashion Institute, Novozymes, DC Ingredients, DLF Trifolium, Arla Foods, and AKV Langholt. Program can be downloaded here (this does not require dropbox):

<https://www.dropbox.com/s/32ln6tkcdm4on20/Bioeconomy%20Conference%20Programme.pdf?dl=0>

Time: 1 December 2014 from 9.00-14.00

Venue: Danish Agriculture & Food Council, Axelborg, Axeltorv 3, 1609 Copenhagen V

Please sign up no later than 17 November for the conference by contacting Eva Friis Mortensen on emo@lf.dk and indicate your name, title and company/organization/authority.

BIOVALUE SPIR

BIO-VALUE SPIR INTERNATIONAL ONE-DAY SEMINAR ON BIOREFINERY, DEC. 4TH 2014

SIGN UP FOR THE SEMINAR – click here: <http://biovalue.dk/biovalue-international-seminar/>

Bio-Value SPIR is hosting an open seminar on biorefinery. Join us for a great opportunity to discuss the scientific highlights and the strategic routes for European and global biorefinery! You are welcome to forward this invitation to relevant guests.

One-day seminar on high value products from biomass 4th of December 2014, KU-SCIENCE, Frederiksberg, Denmark
Limited seats available - don't miss out - sign up as soon as possible

Leading scientists and industry representatives from USA, The Netherlands, France and UK will each present expert knowledge within the value chains from biomass to high value products. The seminar is free of charge and offers an informal reception afterwards for extended networking. Meet the academics and industries working in Bio-Value projects.

Location: "Fest auditorium" at University of Copenhagen, Faculty of Science, Bülowsvej 17, DK-1870 Frederiksberg C (Aud. A1-01.01)
Please find below a short presentation of the international speakers for the seminar.

 Dr. Keith Waldron , Director of The Biorefinery Centre, Norwich Research Park, UK Title: Tailored solutions to convert biomass into added value products	 Dr. Arland T. Hotchkiss , USDA, ARS. Title: Advanced bio-conversion and separation technologies in creation of new value-added products from agro-industrial streams	 Jean-Luc Dubois , Scientific Advisor, ARKEMA, France Title: From Market demand to new value chains: oil crops for future European biorefineries	 Dr. Johan Sanders , Wageningen UR Food & Biobased Research Title: European perspective on economic opportunities of various biomass value chains and approaches to reduce their barriers to transition
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Figure 1: One-pager for inviting guests to BioValue's International Seminar on biorefinery 4th of Dec. 2014.



Authors: S. Tolborg, A. Katerinopoulou, D.D. Falcone, I. Sádaba, C.M. Osmundsen, R.J. Davis, E. Taarning, P. Fristrup and M.S. Holm

Sn-Beta is a zeotype material containing tin incorporated in the zeolite framework. In recent years interesting potential uses of Sn-Beta have been explored within the emerging area of biomass conversion. For instance Sn-Beta has been found to be a useful catalyst for the synthesis of lactates – a biodegradable plastic monomer – from sugars. Apart from this reaction, Sn-Beta also catalyzes the isomerization of monosaccharides e.g. glucose to fructose.

In spite of the interest in Sn-Beta, fundamental aspects of the effect of tin during the preparation of the catalyst are still not fully understood. The aim is therefore to identify the effect of the presence of tin (Sn) on the synthesis of Sn-Beta materials on the crystal morphology, crystallization time and distribution of tin in the individual crystals. Understanding the role of tin could help increase the amount of active sites which can be incorporated in the zeolite framework. Understanding and controlling the crystal morphology as well as the accessibility to the active tin sites are important for the activity of the catalyst.

Sn-Beta zeolites were synthesized with various levels of tin coming from various Sn-sources. Purely siliceous Beta was prepared as controls. Powder X-ray diffraction (XRD) patterns, elemental composition, surface area and pore volume were measured along with electron images, element maps and characteristic X-rays. Catalytic testing and leaching experiments was performed.

Results

The hydrothermal synthesis time required to obtain Sn-Beta samples of high crystallinity (>95%) was found to vary greatly with the amount of tin present in the synthesis mixture. When no or low amounts of tin (0.5 wt%) were present during the synthesis, fully crystalline Beta samples could be obtained after only 4 days. Further tin addition increased the required

synthesis time up towards 60 days for 1.9 wt%. This clearly shows the impracticality of preparing Sn-Beta catalysts with higher tin loadings.

The addition of tin has a clear effect on the morphology. When tin content increases, a systematic change in the morphology occurs with crystals changing from pyramidal to plate-like. It was also observed that tin is primarily found as a shell with a thickness corresponding to roughly half the distance along the center of the crystal independent of the amount of incorporated tin (see figure). Samples using alternative tin sources gave rise to a similar tin gradient.

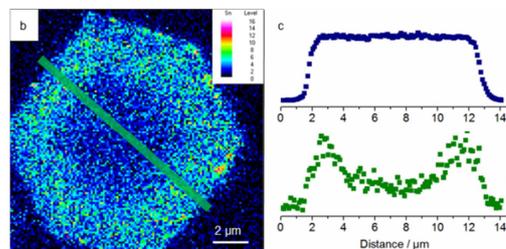


Fig 4b+c from article: b) Sn X-ray intensity for Si (blue) and Sn (green). Data for (c) were extracted from the map at the area indicated by the green outline on (b) and averaged across the thickness of the line.

Crystals prepared using a variety of tin sources all yielded active catalysts for the conversion of 1,3-dihydroxyacetone to methyl lactate except for when using SnO₂ where no activity was obtained and the crystals resembled purely siliceous Beta crystals.

Conclusion

Incorporation of tin introduces Lewis acid sites in the zeolite material and directly affects the growth kinetics and the morphology of the resulting crystals. Tin is not evenly distributed in the bulk crystal but rather localized as a tin-rich shell. Catalytic activity increased with increasing tin incorporation.

37th Symposium on Biotechnology for Fuels & Chemicals

Speaker and poster abstracts are now being accepted online.

Abstracts due December 1st in the following research topics:

- Feedstocks (3 sessions)
- Pretreatment and Fractionation (3 sessions)
- Enzyme Science and Technology (3 sessions)
- Microbial Science and Technology (3 sessions)
- Renewable Fuels, Chemicals, and Bio-based Products (4 sessions)

<http://www.simbhq.org/sbfc/>