Scientific Article Exercise

Or: What is the difference between scientific article and webpage?

CHEM-E0105 2020-2021 ALC Scientific Article Exercise

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Updated 11.1.2021

Scientific article exercise (SAE) is new in 2020-2021

CHEM-E0100
Information search exercise

- Discontinued

Full revision of the contents and instructions, to fit a general MSc course. New videos created.

CHEM-E0105
Scientific Article Exercise

- Earlier developed as module: **CHEM-E1140 (Catalysis for Biomass Refining) Individual Article Summary**
- Overall positive student feedback
- Moved to ALC course:
  - CHEM-E1140 discontinued in 2020
  - Replaces the Information search exercise

Outline

- Intended learning outcomes
- Planned time allocation
- On six short videos on scientific articles

Questions via presemo.aalto.fi/sae

- SAE instructions and MyCourses items
- On feedback

Please give feedback via presemo.aalto.fi/sae

SAE, Intended learning outcomes

- understand what differentiates scientific articles from other publications such as web pages
- be able to recognize typical parts of a scientific articles (IMRaD) and find the conclusion of an article
- know how to formulate citation in a given format
  (we practice the format of Aalto CHEM instructions)
- be able to describe how the impact of a scientific journal and of an individual article is (attempted to be) assessed
- have practiced formulating your own view (/comment/opinion) on a scientific article
- be able to use a plagiarism detection software
- have practiced skills of peer evaluation

SAE, Intended learning outcomes

- understand what differentiates scientific articles from other publications such as web pages ***The whole SAE***
- be able to recognize typical parts of a scientific articles (IMRaD) and find the conclusion of an article ***Video 1, your SAE***
- know how to formulate citation in a given format (we practice the format of Aalto CHEM instructions) ***Video 3, your SAE***
- be able to describe how the impact of a scientific journal and of an individual article is (attempted to be) assessed ***Video 5, your SAE***
- have practiced formulating your own view (/comment/opinion) on a scientific article
- be able to use a plagiarism detection software ***Your SAE & MyCo activities***
- have practiced skills of peer evaluation

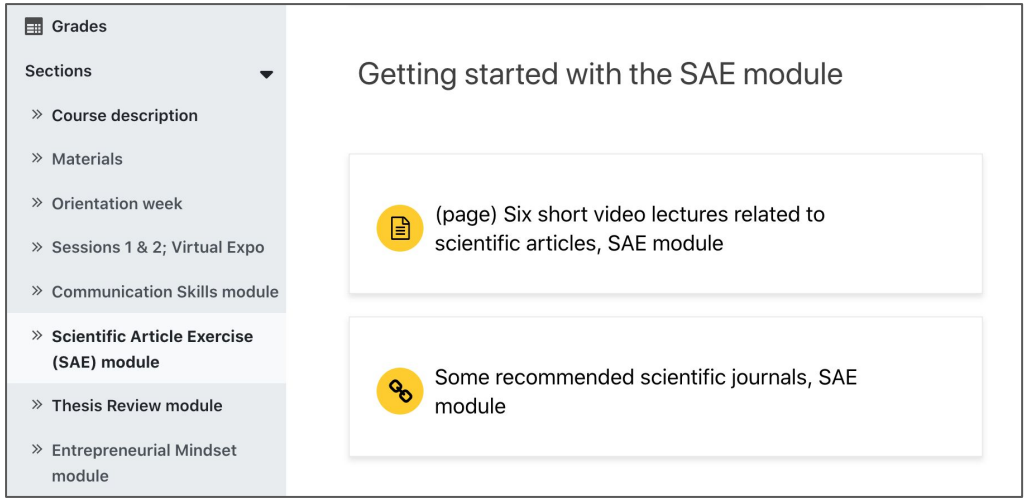
Planned time allocation - total 0.8 ECTS, 22 h

Activity	h	points
Initial contacts sessions (lectures) and brief videos	3	
Find article, register and return a publisher-formatted pdf (MyCo Items 1-3)	3	10
Read the article and make your SAE report following the provided templated	8	
Return the SAE report to workshop and provide your input to the collective documents (MyCo Items 4/1; 5-9)	2	58
Make peer evaluation for three other SAE reports (MyCo Item 4/2)*	4	20
Fetch and return a Turnitin report on your SAE report (MyCo Item 10)	1	12
Wrap-up contact session	1	
	22	100

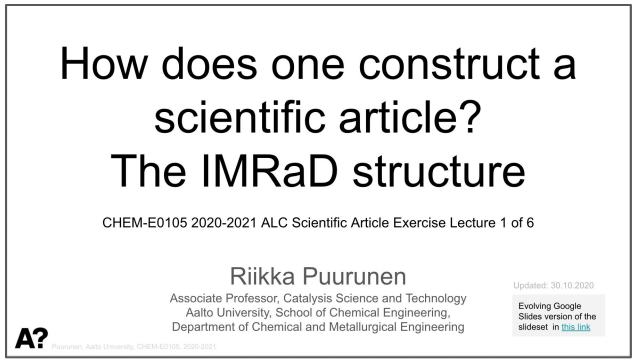
60 points needed to pass. *Obligatory item.

Getting started: Six short videos

- Videos in Panopto
- Pdf slides
- Google slides (evolving) [Aalto GDrive login needed]



1. How does one construct a scientific article? The IMRaD structure
2. How does one publish a scientific article? Peer review, and more
3. What's in a citation? (And what's not?)
4. How to create reference lists effectively?
5. "Impact is everything" — How is impact of journals and articles evaluated?
6. Quickest way to get (in)famous as a scientist? On scientific misconduct



Six short SAE videos: Content picks

Typical construction of an article (IMRaD)

Abstract

* the article in a nutshell
* formally not part of the article

Introduction
* "why"?
* "setting the scene" to the work
* usually includes lots of literature citations
* goal of the work & limitations to scope (usually at the end, last paragraph)

Materials and Methods
* how?
* sufficient details that the work can be reproduced by skilled others

Results
* what results were gained? (detailed objective description)
* tables, figures, schemes, …

Discussion
* how do results compare with literature?
* what do the results mean and why they are important?

Conclusion/Summary (optional)
* "so what"?
* interpretation of the key results and highlighting the novelty and significance
* (usually no figures/tables/references)

References

One example: PCCP instructions for authors, accessed 30.9.2020,
https://www.rsc.org/journals-books-databases/journal-authors-reviewers/prepare-your-article/#format-layout

Simplified view by Riikka Puurunen, 30.10.2020

A?

Core of the modern scientific process: Peer review

https://en.wikipedia.org/wiki/Peer_review

1. Journal editor(s) judge whether the topic of a manuscript is in principle suitable for the scope of the journal. (If not → "desk rejection")
2. Manuscript is sent out to other scientists from the field (=peers) for evaluation
   - Peers (referees/reviewers) give a recommendation of publishing/not publishing the manuscript
   - Often, list of simple questions is answered, and free-formed feedback given to authors
   - Always checked, if authors back up claims with evidence
3. Editor decides: accept, major revision, minor revision, reject
4. If major/minor revision, authors may make improvements and resubmit
   - The editor(s)/peers review the work again
   - There may be many rounds of peer review and revisions
5. Final decision by the editor: accept / reject

A?

What is in the bibliographic entry of a journal citation? (Following Aalto CHEM guidelines)

Langmuir, I., The adsorption of gases on plane surfaces of glass, mica and platinum, *J. Amer. Chem. Soc.* **40** (1918) 1361–1402.

Cremers, V., Puurunen, R.L. and Dendooven, J., Conformality in atomic layer deposition: Current status overview of analysis and modelling, *Appl. Phys. Rev.* **6** (2019) 021302.

Authors, Title, *Abbreviated journal name*, **volume** (year) page-to-page (or article number)

A?

Recommended: reference management system

- "Writing is rewriting" → the order in which you cite, will change in revisions
- Having to reorder references manually for each revision
  - Needs great care!
  - Feels (is!) a waste of time
- Reference management software can help, BUT...
- ...NOTE: your own organization can make a big difference

MENDELEY zotero ProQuest RefWorks EndNote™ JabRef

- https://en.wikipedia.org/wiki/Comparison_of_reference_management_software
- https://libguides.aalto.fi/c.php?g=410674&p=2797604

A?

International: Journal Impact Factor (JIF, IF)

https://en.wikipedia.org/wiki/Impact_factor, accessed 29.9.2020:

"The impact factor (IF) or journal impact factor (JIF) of an academic journal is a scientometric index that reflects the yearly average number of citations that articles published in the last two years in a given journal received. It is frequently used as a proxy for the relative importance of a journal within its field; journals with higher impact factors are often deemed to be more important than those with lower ones."

$$\mathrm{IF}_y = \frac{\mathrm{Citations}_y}{\mathrm{Publications}_{y-1} + \mathrm{Publications}_{y-2}}$$

A?

Fabrication, falsification, plagiarism (FFP)

FFP: three types of scientific misconduct, internationally recognized.
https://en.wikipedia.org/wiki/Scientific_misconduct, accessed 29.9.2020:

- "Fabrication is making up results and recording or reporting them. ..."
- "Falsification is manipulating research materials, equipment, or processes or changing or omitting data or results such that the research is not accurately represented in the research record."
- "Plagiarism is the appropriation of another person's ideas, processes, results, or words without giving appropriate credit. ..."

A?

Let’s go to:

https://presemo.aalto.fi/sae

(https://presemo.aalto.fi/sae/screen)

Instructions and MyCourses items

CHEM-E0105 2020-2021

Scientific Article Exercise (SAE): Introduction and instructions

Riikka Puurunen, initiated 19.8.2020, updated 8.1.2021

(file) Scientific Article Exercise (SAE): Introduction and instructions

PDF document

Items 1 & 2

1 Register for the SAE module

Some recommended scientific journals, SAE module

Restricted Not available unless: You belong to **SAE Group A**

2 (OU wiki) Find a unique article and register it for your unique code (A1, A2, ...) (DL 18.1.)

Being tested: In addition to registering an article, students can also upload their pdf's for other students to see? (Update: if you start the filename with your unique code, the file is easiest to find, for others.)

Some recommended scientific journals, Scientific Article Exercise (SAE) module (collection Prof. Puurunen & Aalto CHEM majors)

Master's Programme in Chemical, Biochemical and Materials Engineering

https://into.aalto.fi/display/encbme

Major	Journal title	Link to journal website
Biomass Refining		
https://into.aalto.fi/display/encbme/Bi	ACS Sustainable Chemistry & Engineerin	https://pubs.acs.org/journal/ascecg
	BioResources	http://www.bioresourcesjournal.com/
	Bioresource Technology	https://www.journals.elsevier.com/bioresource-technology
	Cellulose	https://link.springer.com/journal/10570/volumes-and-issues
	Carbohydrate Polymers	https://www.sciencedirect.com/journal/carbohydrate-polymers
	ChemSusChem	https://chemistry-europe.onlinelibrary.wiley.com/loi/1864564x

Each student a unique <u>original article</u>

Or: Use scientific search engines

Scientific search engines that you can use to find an interesting article are for example following.

- https://www.webofknowledge.com/
- https://www.scopus.com/

If you find a scientific article from a journal that is not in the list, you should double-check that the journal is included in the Finnish “JUFO” list (https://www.tsv.fi/julkaisufoorumi/haku.php?lang=en)

Item 3 10 pt for correctly returned pdf

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A

3 (assignment) Return a publisher-formatted pdf of your article (DL 18.1.)

Name the file: YourCode_AuthorYear_optionally-something-else-if-you-like.pdf [Example name: A0_Ruuttunen2020.pdf]

Topics in Catalysis (2019) 62:724–737
https://doi.org/10.1007/s11244-019-01161-6

ORIGINAL PAPER

Solvent-free Hydrodeoxygenation of γ-Nonalactone on Noble Metal Catalysts Supported on Zirconia

José Luis González Escobedo[1] · Eveliina Mäkelä[1] · Aki Braunschweiler[1,3] · Juha Lehtonen[1,3] · Marina Lindblad[2] · Riikka L. Puurunen[1] · Reetta Karinen[1]

Published online: 20 March 2019

Abstract
The possibility to valorize levulinic acid (LA) dimers to lignocellulose-based biofuels via hydrodeoxygenation (HDO) was assessed using γ-nonalactone (GNL) as a model compound. Catalytic HDO experiments were performed in a batch reactor at 280 °C and at an average pressure of 57.5 bar H_2. Noble metal (Ru, Rh, Pd, and Pt) catalysts supported on ZrO_2. All the catalysts were active in removing oxygen from the reactant. However, the most selective catalyst for hydrocarbons (24%) was ruthenium. Unlike the other tested catalysts, Ru also provided branched hydrocarbons. In view of Ru's comparatively high selectivity to hydrocarbons, it was tested at various reaction temperatures (220–280 °C) for 300 min. The experiments at lower temperatures resulted in less hydrocarbons and more intermediate products, such as alcohols. In total, nearly 70 products were identified, and some of the reactions that likely occurred in the HDO experiments were discussed. The production of hydrocarbons from GNL highlights the potential of LA dimers as a route to lignocellulose-based biofuels.

Keywords Levulinic acid dimer · γ-Nonalactone · Hydrodeoxygenation · Noble metal · Hydrocarbon · Fuel

d the insufficiency of
attention of research
ne of these alterna-
sidered as an abun-
d fuels [2]. The raw
which contain many

fkelä contributed

e version of this
161-6) contains
authorized users.

al Engineering,
Aalto, Finland
Porvoo, Finland
Centre of Finland

functional groups, can be transformed into various chemical intermediates and final products [3]. Levulinic acid (LA), in addition to furfural, is one of the most important platform chemicals [4–6], which can be produced from lignocellulosic sugars: hexoses or pentoses [5].

LA, a γ-keto-carboxylic acid ($C_5H_8O_3$), is highly reactive and has several applications as a specialty chemical in agriculture, chemical industry, and in the food industry [7]. γ-Valerolactone (GVL) is an important chemical produced from LA via homogeneous (e.g. $RuCl_2(PPh_3)_3$) or heterogeneous (e.g. Ru/C) catalysis [8]. Recently, the catalytic conversion of GVL to fuels has been studied [8]. So far, the target has been to produce bio-based oxygenates to be blended with gasoline. For example, the production of 2-methyltetrahydrofuran (MTHF), which can be blended with gasoline, has been reported by Bozell et al. [9]. Hydrocarbons are usually considered undesired products in the hydrodeoxygenation (HDO) of GVL, because the carbon chain is too short for transportation fuels. In fact, heavier hydrocarbons are necessary for bio-based jet fuel or diesel [10]. Converting GVL to pentenoic acid offers at least two possible routes to heavier hydrocarbons [8].

Bond et al. [11] studied the ring-opening of GVL to pentenoic acid, which in turn was decarboxylated to butenes.

Springer Link Search Log in

Original Paper | Open Access | Published: 20 March 2019

Solvent-free Hydrodeoxygenation of γ-Nonalactone on Noble Metal Catalysts Supported on Zirconia

José Luis González Escobedo, Eveliina Mäkelä, Aki Braunschweiler, Juha Lehtonen, Marina Lindblad, Riikka L. Puurunen & Reetta Karinen

Topics in Catalysis **62**, 724–737(2019) | Cite this article

Download PDF

Sections Figures References

Abstract

The possibility to valorize levulinic acid (LA) dimers to lignocellulose-based biofuels via hydrodeoxygenation (HDO) was assessed using γ-nonalactone (GNL) as a model compound.

https://doi.org/10.1007/s11244-019-01161-6

Item 4/1

(link) Scientific Article Exercise (SAE) report template

Restricted Not available unless: You belong to **SAE Group A**

4 (workshop) Return your SAE report (DL 25.1.) and make peer evaluation

This workshop is used (1) for returning your SAE report and (2) for peer evaluation.

- Name your file: YourCode_AuthorYear_optionally-more.pdf (example: A0_Yimetal2020_favouritepaper.pdf)

Identification via student's unique code (don't write your name)

Scientific Article Exercise, CHEM-E0105 ALC 2020-2021

[template by Prof. Riikka Puurunen, 16.12.2020]
[delete the grey instructions from the final document]

[title] Your Code, Author, year
[Example: A0, Yim et al., 2020]

Part 1: Technical summary

Bibliographic entry for a reference list, numeric style:

Write the reference as instructed in the Aalto CHEM guidelines for written reports, available via MyCourses. Pay careful attention to details: where is a comma, where a point, where capital letter, where italics, etc. Journal title is entered in an abbreviated form.[1]

Model:
Author1, A.B., Author2, B.C. and Author3, D.E., Article title (letters NOT capitalized), *Journal name in abbreviated form* volume (year) firstpage-lastpage. <feel free to add a DOI-hyperlink>>

Example:
Gutierrez, A., Turpeinen, E.-M., Viljava, T.-R. and Krause, O., Hydrodeoxygenation of model compounds on sulfided CoMo/γ-Al2O3 and NiMo/γ-Al2O3 catalysts; Role of sulfur-containing groups in reaction networks, *Catal. Today* 285 (2017) 125-134.
https://doi.org/10.1016/j.cattod.2017.02.003

Author affiliations:
List the affiliations (=where the work was made) of maximum three persons: the first author and two other authors

Article-related dates:
Article-related dates, as reported in the article itself, e.g.: first received, received in updated form, first published, and optionally other dates mentioned

Alternatives: 5a GDocs; 5b Overleaf (LaTeX)

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A

5a (link) Enter your formatted reference into the collective summary - G Docs alternative (DL 25.1.)

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A

5b (link) Enter your formatted reference into the collective summary - Overleaf alternative (DL 25.1.)

[5b is a trial: let's see if the joint LaTeX file file works, for those interested -- if not, we will all use the Google file of 5a]

Overleaf writeLaTeX

CHEM-E0100 ALC 2020-2021, Scientific article exercise reference formatting collective summary (G Docs)

Initiated by Riikka Puurunen, 8.1.2021

How will this file be used?

Instruction for students:

1. Find your article code (A1, A2, etc) and fill in the title the missing part "Article identifier" = Author (et al.), year [example: Gutierrez et al., 2017] (style: Heading 2)
2. Hit “enter” after the title, to create a new row in the file (style: normal text), and
3. Copy-paste your correctly formatted scientific article citation below (you should have paid careful attention to how the citation is formatted).
4. Please be careful only to edit your dedicated part of the document. Do not edit the instructions or other people’s entries.
5. Do not include your name in the document, as this document is visible for anyone with the link. You will be identified by the code (A1, A2, …)
6. You can update your entry until the deadline of the Scientific article exercise assignment. Please make sure that you have the same formatting in your Scientific article exercise document and here.

Items 6-8

Restricted Not available unless: You belong to **SAE Group**

A

6 (link) Article overview and statistics: add your row in the collective summary table (DL 25.1.)

Restricted Not available unless: You belong to **SAE Group**

A

7 (link) Figure collection: add your pick (DL 25.1.)

Restricted Not available unless: You belong to **SAE Group**

A

8 (link) Table collection: add your pick (DL 25.1.)

CHEM-E0100 ALC 2021 Scientific article execise, overview table

* Students: please copy-paste here your tabular information, in the place of your article code

* Please be careful not to edit another person's row (use "undo" if you accidentally changed other person's info)

* sharing, as of 10.8.2020: anyone with the link can *view*

Code	Article identifier Author (et al.), year	Abbreviated journal name	No. of pages	No. of figures	No. of tables	No. of cited references	Times cited (Web of Science)	Journal Impact Factor	JUFO level	Copyright line	Creative Commons licence?	Digital Object Identifier (DOI link)
A0	Gonzalez Escobedo et al., 2019	Top. Catal.	14	7	1	49	0	2.226	1	© The Author(s) 2019	CC BY 4.0	https://doi.org/10.1007/s11244-019-01161-6
A1												
A2												
A3												

A0, Gonzalez et al., 2019 (teacher's example)

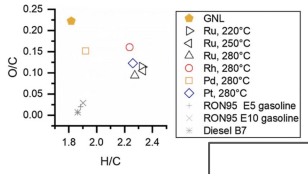

Figure 2: van Krevelen diagram. Molar H/C and O/C of the organic liquid product mixtures obtained with ZrO_2-supported catalysts compared to the reactant (GNL) and to standard fuels [29]. In the case of 280 °C reactions, the reported products were obtained at 30–40% GNL conversion. The values exclude unconverted GNL and water. Reaction temperature in legend. Note that the Ru catalyst contained chloride species

Gonzalez et al., Topics in Catalysis 62
[© The Author(s) 2019, Creative Comm

A0, Gonzalez et al., 2019 (teacher's example)

Table 1 Textural properties of fresh and spent (280 °C, 30–40% conversion) noble metal catalysts supported on zirconia

Catalyst	Physisorption			Chemisorption			STEM		
	S_{BET} (m^2/g)	Pore volume (cm^3/g)	Average pore diameter (nm)	Irreversible adsorption capacity ($\mu mol_{gas}/g_{cat}$)	Dispersion (%)	Average particle size (nm)	Average particle size (nm)[d]	Relative standard error of particle size (%)[d]
ZrO_2	64	0.27	11					
2.7 wt% Ru/ZrO_2	80	0.32	10	15[a]	11[a]	8.0	1.5	6.1
2.5 wt% Rh/ZrO_2	58	0.23	11	209[b]	87[b]	1.2	2.0	5.1
3.0 wt% Pd/ZrO_2	64	0.26	11	60[b]	21[b]	5.3	2.9	8.7
2.7 wt% Pt/ZrO_2	65	0.22	13	52[b]	37[b]	2.7	1.9	3.2
Ru/ZrO_2 spent	70	0.25	8	25[a]	19[a]	4.8	1.8	6.0
Rh/ZrO_2 spent	54	0.22	9	35[b]	15[b]	7.4	4.8	4.0
Pd/ZrO_2 spent	60	0.25	10	20[b]	7.0[b]	16	5.4	3.3
Pt/ZrO_2 spent	71	0.28	10	31[b]	23[b]	4.5	3.8	2.7

[a] H_2 chemisorption, 75 °C

[b] CO chemisorption, 35 °C

[c] Population means statistically inferred from STEM images

[d] Based on a normal distribution with 95% confidence level

Gonzalez et al., Topics in Catalysis 62 (2019) 724–737. https://doi.org/10.1007/s11244-019-01161-6 [© The Author(s) 2019, Creative Commons Attribution 4.0 International License]

Turnitin - learn to use plagiarism detection software

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9 (Turnitin assignment) Make plagiarism check for your SAE report (DL 25.1.)

Restricted Not available unless: You belong to **SAE Group A**

10 (assingment) Return your Turnitin report pdf (DL ~~5.2.~~)
DL 6.2.

- Fetch a Turnitin report on your SAE report, in Item 9.
- Download it as pdf, with all marks included, and return in Item 10.
- (Similarity percentage will be large: don’t worry! Here, it should be high.)

Make peer evaluation for three SAE reports

Restricted Not available unless: You belong to **SAE Group A**

4 (workshop) Return your SAE report (DL 25.1.) and make peer evaluation

This workshop is used (1) for returning your SAE report and (2) for peer evaluation.

- Name your file: YourCode_AuthorYear_optionally-more.pdf (example: A0_Yimetal2020_favouritepaper.pdf)

CHEM-E0105 ALC, SAE module

Document updated by Riikka Puurunen 10.12.2021 (tentative, details may cl

Aspect no. in peer evaluation	Description	Points
1	Bibliographic entry correctly formatted according to Aalto CHEM guidelines	8
2	Author affiliations correctly found	2
3	Article-related dates correctly found	2
4	Publisher correctly found	2
5	Copyright line of the article correctly given	2
6	Potential Creative Commons (or another open access license) correctly found	2
7	Numbers found: number of pages, figures, tables, cited references	2
8	Number of times cited found (Web of Science), with date indicated	2
9	Latest impact factor correctly found	2
10	Current JUFO class correctly found	2
11	Info copy-pasted in the collective spreadsheet, as requested	2
12	Abstract of the article correctly copied	2
13	Example figure provided, including figure caption	2
14	Example table provided, including table caption	2
15	Main goal found	2
16	Methods (briefly) described	2
17	Main result or conclusion stated	2
18	Funding source info found (or the absence of it)	2
19	Student's own free-form comments	8

Schedule and deadlines

Schedule & deadlines

Module starts Monday 11.1.2021

(After lecture 11.1.2021:
Dates corrected 2020→ 2021
and
3rd DL updated)

- 1st set of deadlines Mon 18.1.2021
  - Items 1-3
- 2nd set of deadlines Mon 25.1.2021
  - Items 4-9 (Item 4/1: SAE report returning, no peer evaluation yet)

Peer evaluation opens Mon 1.2.2021 (latest)

- 3rd set of deadlines Fri 5.2.2020 Sat 6.2.2021
  - Item 4/2 peer evaluation
  - Item 10

Some feedback from CHEM-E1140

- “Kaikenkaikkiaan tämä tehtävä ja sen toteutus on jo ainakin meidän korkeakoulussa huippuluokkaa. Ottaa opiskelijat huomioon hyödyntäen monipuolisesti digitaalisia työkaluja. Ohjeet ovat kattavat ja selkeät. Toivottavasti opetus suuntautuisi laajemminkin tähän suuntaan …”

- More feedback in MyCourses of CHEM-E1140 2019-2020 (and 2018-2019, 2017-2018)

Please give feedback in:
https://presemo.aalto.fi/sae

If MyCo items don't work, please email me at firstname.lastname@aalto.fi

Good luck with your scientific article exercise! Hopefully it is fun & educational!

Your Aalto Thesis

References

[1]... [50]... [100]...

Additional material

ALC 2019-2020, information search exercise Example (shared to highlight the renewal in ALC)

CHEM-E0100 Academic Learning Community, information search exercise Search for information by using at least three different information search databases (Scopus, SciFinder, Espacenet, or others) available through Aalto University Learning Centre. Based on your findings, write a report answering the questions below. Citations and references are required to be included, according to a reference system of your choice, e.g. name-year or number reference system; you can use RefWorks or other software for reference management. The length of your answers should be altogether 1 000 – 1 300 words, excluding the bibliography (ca. 3 A4 pages in total). Please return your answers to MyCourses in either .doc or .pdf forms latest on 17.11.2019. If you have any questions concerning searching for information or the questions below, please contact <>, xx.yy@aalto.fi. Utilizing CO2: Can gold be used as a catalyst in reactions CO2 + H2 --> products 1. Based on the available literature, what kind of gold catalysts have been used in reaction CO2 + H2 --> products ? 2. There are various reaction routes for CO2 hydrogenation, present these routes. Which routes are preferred with Au catalysts and which are the products in these routes? 3. Which factors are affecting the products/product distribution (e.g. properties of catalysts, support of the catalyst)? 4. Are there any differences in the activities of various types of gold catalysts? Are some gold catalysts better than the other ones in these reactions? In the end of your report, name the databases (minimum three) you used for the information search, and evaluate shortly, which you found the most useful and/or relevant for your topic, and why.