

بسم الله الرحمن الرحيم



- **Prof. Dr/ Ehssan Nasef**
- **Petrochemical Department,**  
**Faculty of Eng,Pharos University,Alexandria**
- ❖ **Executive Director**  
**of Filed Training Center in Pharos University Alexandria .**
- ❖ **Academic Advisor of student chapter(SPE) in petrochemical Dept.**
- ❖ **Assistant Trainer (AT )from IBCT.**
- ❖ **A Consultant in Production Technology of Petroleum,Petrochemicals and gas Technology**  
**From Engineerin Egyptian Cyndicate..**



## Academic Achievements

### ❖ School of Engineering Sciences in Chemistry, Biotechnology and Health

#### ❖ Visiting three departments.

Professors.(courses , exams, research)

Labs.

study program.

#### ❖ Green House labs.

#### ❖ Attending two conferences.

#### ❖ KTH Bibliotique.

#### ❖ DIVA website.

#### ❖ ARC Center.

#### ❖ Social activities.

#### ❖ Action plan



4

# School of Engineering Sciences in Chemistry, Biotechnology and Health(CBH) (250 Students per year)

- Dept of Fibre and Polymer Technology
- Dept of Chemistry
- Dept of Chemical Engineering
  - Dept of Engineering Pedagogics
- Biomedical Engineering and Health Systems
- Theoretical Chemistry and Biology
- Protein Science
- Industrial Biotechnology



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Dean

**Professor Mikael Lindström**

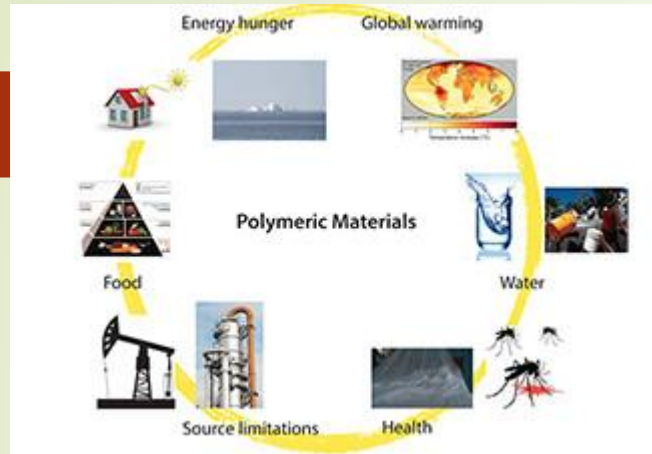
Tel: 08 - 790 6207

[dekan@che.kth.se](mailto:dekan@che.kth.se)

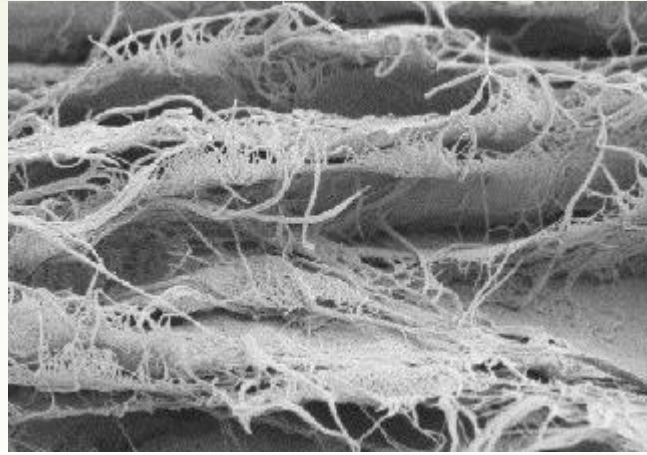
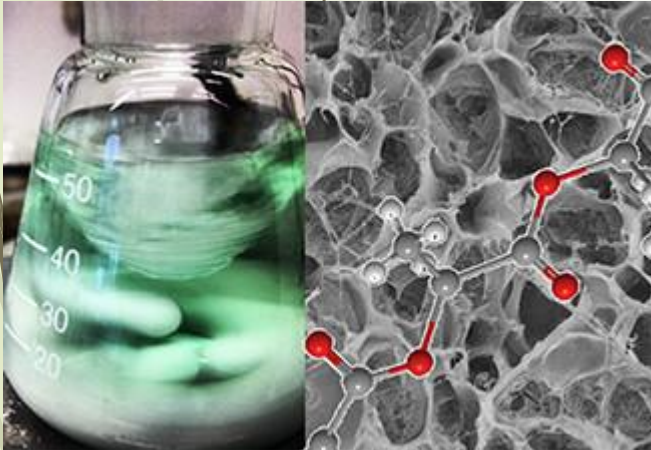
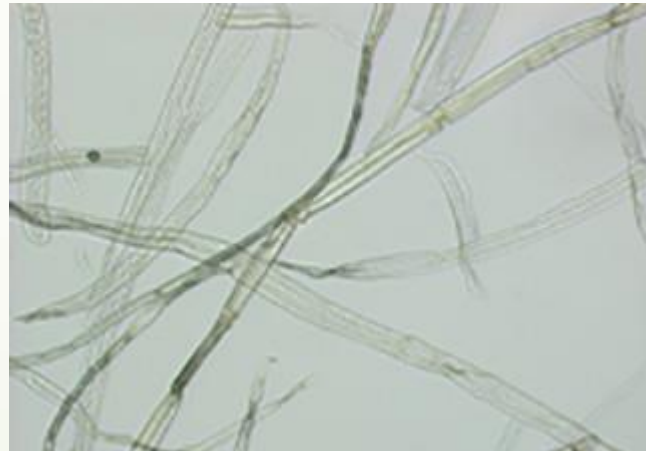
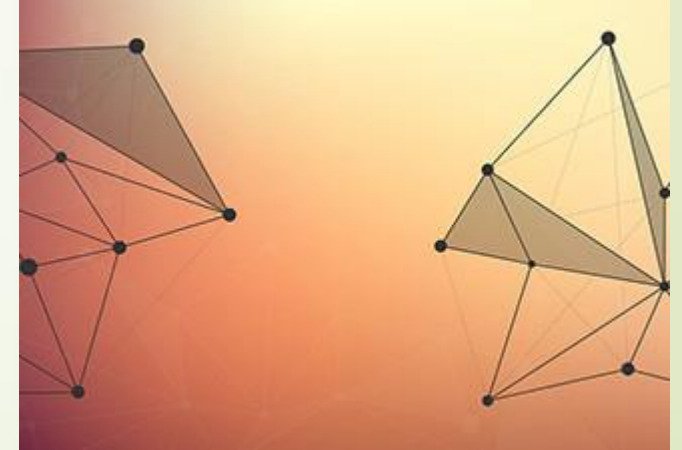


## Academic Achievement

- ❖ **Fiber and Polymer Technology Department**
- ❖ **Engineering Pedagogics Department**
- ❖ **Chemical Engineering Department.**



- Polymeric Materials

BiocompositesFibre TechnologyPolymer TechnologyWood Chemistry and Pulp TechnologyCoating Technology

**KTH Courses in polymers : (110 courses) 50 courses (Bio fiber course ,paper industry, fiber technology and cellulose). 60 courses (polymer courses divided as follows:**

KTH polymer Branches	Polymer physics	Polymer chemistry	Polymer Engineering (Processing)	Polymer Mechanics (material science of polymers)	Fibers And Surface coating.	Degree Project in polymer technology ,coating ,polymeric material projects
PUA Courses Second level courses	<b>EP315</b> <b>(Physical chemistry)</b> <ul style="list-style-type: none"> <li>Polymers in solutions.</li> <li>polymer blends.</li> </ul>	<b>EP214</b> <b>Organic chemistry</b> <ul style="list-style-type: none"> <li>Polymer configuration).</li> <li>Isomerism</li> <li>Organic chemistry</li> </ul> <b>II EP213</b> <b>Reactions and mechanism.</b>	-----	<b>EP31</b> <b>Instrumental Analysis.</b> <b>TGA,IR,SEM.</b> <b>SEC(Polymers</b>  <b>EP217 Material science.</b> <b>Mechanical properties of polymers.</b>	<b>New elective courses.</b> <b>Surface coating.</b>  <b>Paper industry.</b> <b>by law( 2020).</b>	



kin polymer Branches	Polymer physics	Polymer chemis try	Polymer Engineerin g (Processing )	Polymer Mechanics (material science of polymers)	Fibers And Surface coating.	Degree Project in polymer technology ,coating ,polymeric material projects
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Third year level courses	<b>EP220</b> <b>Eng.Thermodyn amics II</b> <ul style="list-style-type: none"> <li>• Thermodyna mics os solution.</li> <li>• Solibility parameters.</li> <li>• Thermodyna mics of mixing.(poly mer solutions)</li> </ul>		<b>EB201</b> <b>Introduction of Petrochemic al industries. Plastic industrty.</b>			
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KTH polymer Branches	Polymer physics	Polymer chemistr y	Polymer Engineering (Processing)	Polymer Mechanics (material science of polymers)	Fibers And Surface coating.	Degree Project in polymer technology ,coating ,polymeric material projects
Fourth year level courses			<ul style="list-style-type: none"> <li>• EP335 Polymer science and Eng.I</li> <li>• EP336 Polymer science and Eng.II</li> </ul>	<ul style="list-style-type: none"> <li>• EP335 Polymer science and Eng.I</li> <li>• EP336 Polymer science and Eng.II</li> </ul>	<b>New elective courses. Surface coating. Paper industry. by law( 2020).</b>	Mini projects (co- operation with industry)
Fifth year					<b>New elective courses. Surface coating. Paper industry. by law( 2020).</b>	Graduation projects (with industry)

## Fiber and Polymer Technology Department

### Meeting with professors:

Prof Mats Johansson

The head of Fiber and polymer Technology”  
Department



**Prof. Mikael Hedenqvist “ the head of Polymeric materials Division : (26/8/2018)**



- ☐ Collaboration in the research in the production of oil from plastic waste. Collaboration in the research of oil from oil shale and using its ash in the treatment of wastewater.
  - ☐ Discussion of the courses of polymer in the department specially Polymer Engineering Courses.
  - ☐ A permission from the professor to attend the lectures and he deliver to me the syllabus of the course and the time table.
- He will give me all the hard copies of the lectures I will attend.



## Discussing the following points:

- ❑ He agreed also to give a video conference in Polymer Eng.Course about a topic of additives. When I asked him if is it possible for him to visit PUA.He answered with my pleasure.

We discuss the possibility of cooperation in research work on two points of research first point :Production of oil from oilshale and use the waste of this process in the treatment of waste water .

He listen to a small presentation from me on this work explaining every point in it and methods of chemical activation, thermal activation of the oil shale after extracting of oil from the samples either by solvent extraction (Methanol,MEK,Toluene,etc..) or methods of retorting . the analysis of samples from oil shale by SEM,XRD,TGA...and he mentioned that he need a samples from this oil shale by chemical and thermal activation to analyze them on BET Analyzer .



- ❑ He wonders also that Swedish has oil shale also. He was very interesting with this project and wants to collaborate this project with me.
- ❑ He asked to have some samples from this work to make some characterization in his lab in Swedish and I told him I will ask if it is possible for our university to allow this and sure if it is possible . I will prepare the samples for him and will discuss the possibility of bringing the samples in KTH. Then we arrange another meeting to discuss the other research project on the production of oil from plastic waste. That will be on next Thursday at 3 o'clock. After This meeting I phoned Dr.Albania and told her about the outcomes of the twice meeting with prof.Mikael and she asked me the possibility of her to attend the 3<sup>rd</sup> meeting with us to talk to prof.Mikal arrange the possibility of his acceptance to Visit PUA on Next February. Then I send an email to excuse him to let Dr.Albania attend part of our meeting I told him that she is the project manager of (KTH PUA) and he answered immediately and Saied with pleasure.

❑



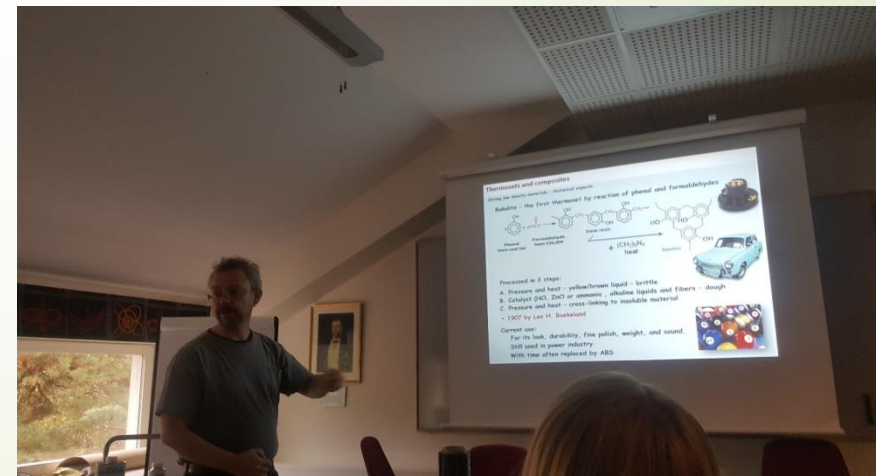
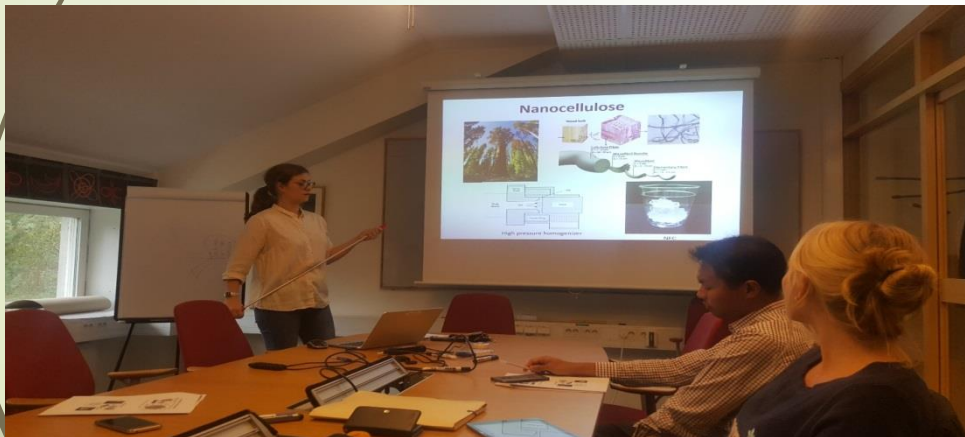
**Prof. Eva Matmstrom,**  
**Head of Polymer coating**



**A photo with Prof.Minna Hakkarainen**  
**Head of polymer technology Division**  
**Polymer Physics Course,Polymer Chemistry Course**



## Attending Lecture and seminars











**Machine for pressing polymers**



**Mechanical tension test**



(casting of polymers)

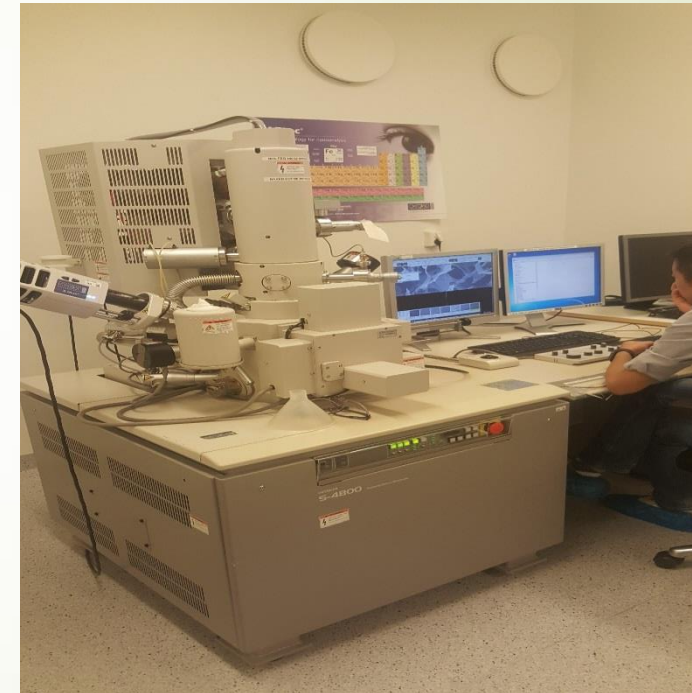


(Machines for molding of plastics)





TGA



Optical Microscope

## Department of Engineering Pedagogics



A photo collects all of the Engineering Pedagogics staffs especially in the social activates of the Departments







### Meeting with Teachers(lecturers):



**Dr. Mats Jansson**

- ❑ Discussing the study plane of the under graduate students of the chemical Eng. Program.
- ❑ He gives to me all his lectures and tutorial for the course and also the lab manual and this all to upgrade the chemical Eng.Course in our department.(General chemistry course).
- ❑ The time of the exam ranges from 3 to 5 hrs begins with the theory part (30-50%) then problems part then any additional questions combined both the student allowed to go to toilet for one time only and can have some food during the examination period.

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- ❑ The time of the exam ranges from 3 to 5 hrs begins with the theory part (30-50%) then problems part then any additional questions combined both the student allowed to go to toilet for one time only and can have some food during the examination period.





**DR.. Katarina Ståhl Kaltea:**

- ❑ She is a lecturer for first cycle students teaching chemistry course and Mathematics.
- ❑ All lecturers in this department give only courses to under graduate students and not allowed to do research.(in Swedish language).
- ❑ She Said the maximum number of students can be accepted in the department is 250 students divided to 5 groups .
- ❑ I got from her some experiments from the lab manual of students.



**DR. Catharina silfverbrand**

- ❑ DR. Catharina silfverbrand : she is the responsible of the following courses :organic chemistry,Analytical chemistry,chemical measuring techniques and sustainable development and chemical Eng. courses.
- ❑ She sent part of materials for organic course and the lab manual from her courses to upgrade our courses.in organic chemistry.



**Prof. Goran Lindbergh**

**course responsible of Engineering Chemistry (KE 1140):**

- ☐ Discussing the contents of the course and the laboratory manual.
- ☐ I get hardcopy of the manual of this course to upgrade the course of General chemistry in our department.(in the appendix)
- ☐ I down load from the canava of the website of the KTH the lectures of this course.

**□ Study plan for Bachelor students and the courses.**

**2.B.1.System (No.1) (180 cr):** Chemical bachelor in engineering, 3 years (can go for work but as Assistance engineer) The study plane as follows (all courses in Swedish language only):  
See Appendix I.(in the report)

**System (No.2) (300 cr) Chemical engineering: both bachelor and master (5 years)(program bachelor one) Study Program as follows :**

See Appendix. .(in the report)

**□ schedule system of KTH (Calendar of KTH):**

The academic year in KTH divided to 52 weeks.

Week one starts on first of January and week 52 ends on 30 December.

The academic year divided to 4 periods each period 6 weeks.

All this orientation as the following table.

AFS  
Schema

## Läsårsindelning 18-19

## 4 läsperioder

P1=35 d, P2=35 d, P3=35 d, P4=39 d

## Höstterminen 2018-08-27--2019-01-14

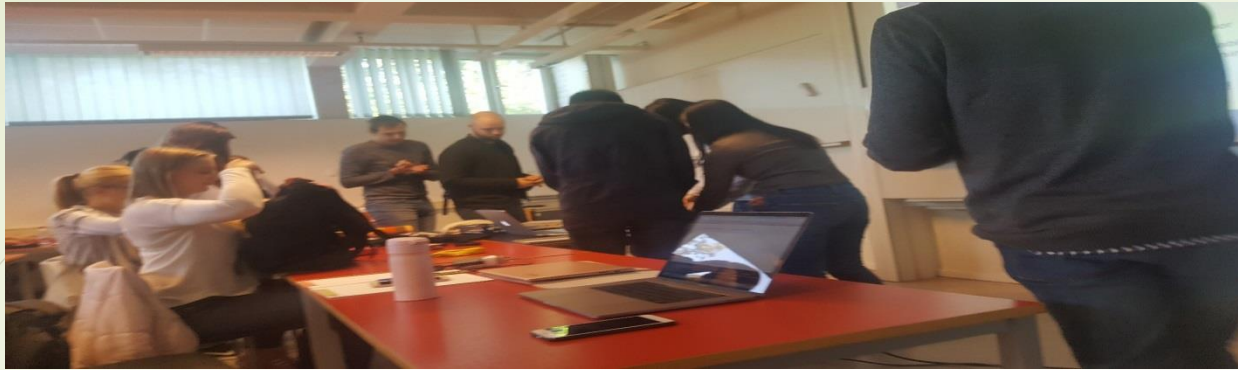
Mån	vecka	Må	Ti	On	To	Fr	Lö	Sö
Aug	33	I/ot	I/ot	I/ot	I/ot	I/ot	I/ot	19 aug
	34	I/ot	I/ot	I/ot	I/ot	I/ot	I/ot	26 aug
1	35	1	1	1	1	1	L	02 sep
2	36	1	1	1	1	1	L	09 sep
3	37	1	1	1	1	1	L	16 sep
4	38	1	1	1	1	1	L	23 sep
5	39	1	1	1	1	1	L	30 sep
6	40	1	1	1	1	1	L	07 okt
7	41	1	1	1	1	1	L	14 okt
8	42	E	E	E	E	T	T	21 okt
9	43	T	T	T	T	T	L	28 okt
10	44	2	2	2	2	2	H	04 nov
11	45	2	2	2	2	2	L	11 nov
12	46	2	2	2	2	2	L	18 nov
13	47	2	2	2	2	2	L	25 nov
14	48	2	2	2	2	2	L	02 dec
15	49	2	2	2	2	2	L	09 dec
16	50	2	2	2	2	2	L	16 dec
17	51	E/OT	E/OT	E/OT	E/OT	E	L	23 dec
18	52	L	H	H	E	E	L	30 dec
19	1	L	H	E	E	E	L	06 jan
20	2	T	T	T	T	T	T	13 jan

## Vårterminen 2019-01-15--2019-06-04

Mån	vecka	Må	Ti	On	To	Fr	Lö	Sö
	3	T	3	3	3	3	L	20 jan
	4	3	3	3	3	3	L	27 jan
	5	3	3	3	3	3	L	03 feb
Feb	6	3	3	3	3	3	L	10 feb
	7	3	3	3	3	3	L	17 feb
	8	3	3	3	3	3	L	24 feb
	9	3	3	3	3	3	L	03 mar
Mar	10	3	E	E	E	T	T	10 mar
	11	T	T	T	T	T	L	17 mar
	12	4	4	4	4	4	L	24 mar
	13	4	4	4	4	4	L	31 mar
Apr	14	4	4	4	4	4	L	07 apr
	15	4	4	4	4	4	L	14 apr
	16	E/OT	E/OT	E/OT	E/OT	H	L	21 apr
	17	H	4	4	4	4	L	28 apr
	18	4	4	H	4	4	L	05 maj
Maj	19	4	4	4	4	4	L	12 maj
	20	4	4	4	4	4	L	19 maj
	21	4	E	E	E	E	L	26 maj
	22	T	T	T	H	T	T	02 jun
Jun	23	T	T	E/OT	H	E/OT	E/OT	09 jun

I Inledande veckor  
 H Helg  
 L Undervisnings- och tentamensfri dag  
 1-4 Schemalagd undervisningsdag i respektive läsperiod  
 T Tentamensdag  
 OT Omtentamensdag  
 E Eget Arbete





Work shops

- ❑ Student Hand book (700 pg):  
Will deliver a softcopy to the IR office at PUA

## .Chemical Engineering Department

- ☐ Applied Electrochemistry.
- ☐ Process Technology.
- ☐ Energy Processes.
- ☐ Nuclear Waste Engineering.
- ☐ Resource Recovery.
- ☐ Transport Phenomena.



**Prof. Youhannus Kiros**



**A photo in my office.**



**Profesour Lars the head of the chemical  
Eng. Department**



**Prof. Henry (Responsible of Masters program and Bachelor  
programs in Chemical Eng. Dept)**





**A photo with Prof. prof.Alvfors (Professor in Energy processing )**

- ❑ The courses in the thermodynamics and that course is a basically course for under graduate students in the second period of the first cycle this course equivalent to our course EP200 (Chemical Eng.thermoynamic I).
- ❑ The second course of thermodynamics was taught for the master students in chemical eng.Department and is equivalent to Chemical Eng.Thermodynamics II.
- ❑ Asked him also about the type of exams for under graduate coursesand about the duration .he answerd that the time of examination (5-7 hrs) and the exam divided to several parts started from the basic fundamentals theoretical questions to the most completed problems during the exam. He gived to me a sample of this exam also



**Ass.Prof. Stefan Gronkvist (Engineering process)**

- ❑ Discussing the important of the Industrial Energy processes for the students in master degree and that should include the technical performance of energy processe in industrial scale with the help of thermodynamics relations .Calculating the combustion reactions and heat yields for different fuels .the thermodynamics calculations on thermal power and combined heat and power cycles .
- ❑ Analyze performance of energy conversion systems in relation to ideal systems and with this as a starting point suggest improvement .
- ❑ This course include the same topics but in differnt subjects in our department.

The Prof.gives me all the lectures notes in his course to be as a guide for the staff of our department.



**Prof.Kerstin Forsberg**  
**. Division of Resource Recovery;**

- ❑ **We discussed the possibility of collaboration in the research in production of rare metals from black Egyptian sand .**
- ❑ **She expressed that it is a very interesting point of research and she hopes to join in such project.**
- ❑ **But we should first find a fund for this project and we will collaborate in writtenig a proposal to the project to find a fund for this.**



**Emeritus Olle Wahlberg**

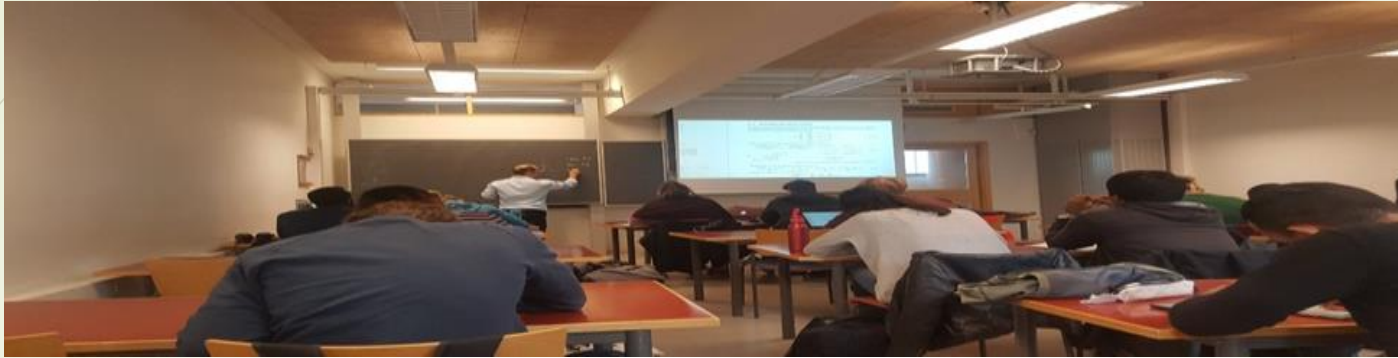
- ☐ Discussing the course content of water chemistry which is related to the course of water treatment and the environmental eng.course.
- ☐ I get from him a manual for the laboratory of this course.
- ☐ In this course the student should deliver a project and each grope should take samples from lakes around stocholm and make the analysis inside the labs using the equipment and write the report upon this results.(Appendix)
- ☐ I get one example for this work.(Appendix in report).
- ☐ He Saied he can be an external examiner for PHD thesis or Master Thesis





**Prof. Ann Cornel** (**Prof. in Applied electrochemistry**)

- ❑ By discussing with her the typical form of the exam she answered that 50% of the exam should be in the theory part of the subjects. The other 50% a problem part. The duration of the exam 5 hours.
  - ❑ She is the only person who is responsible to examine the students and correct the exams.
  - ❑ She should also deliver the results of the exam to the administration part to upload the results in the transcript of the students.
- She may invite one or two of her coworkers to give one or more of the lectures of the course



Attending lecture of subject Advanced transport phenomena with Prof. Mattas Babler (Prof in process Energy in the chemical Eng. Department).

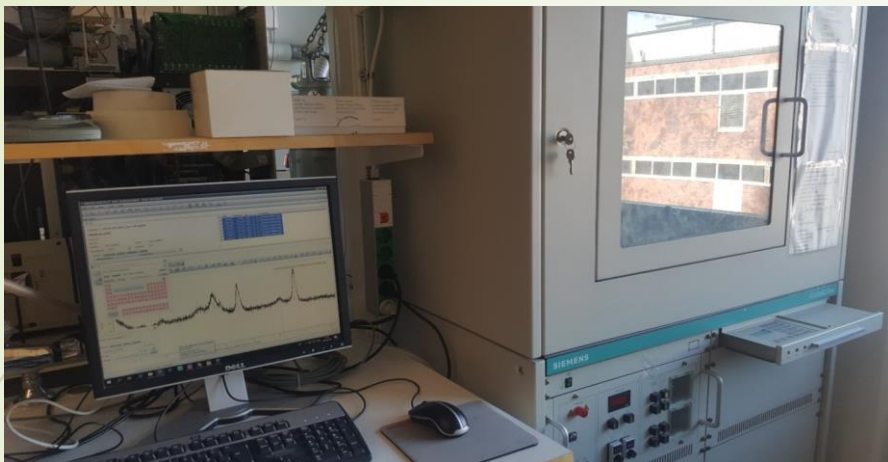


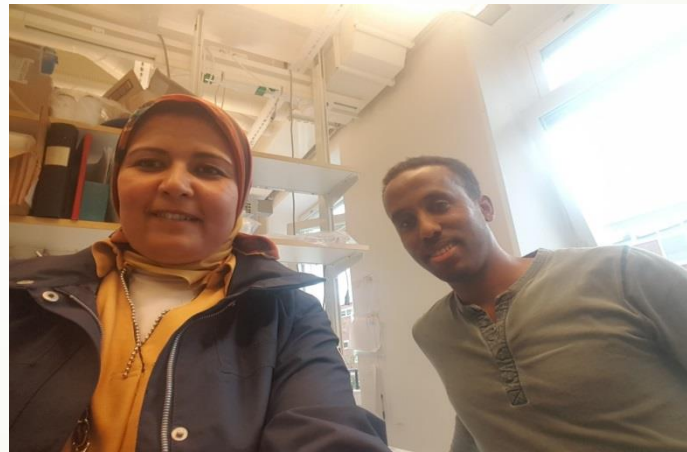
**Photos of Master students in the lab**



**. study plan and courses:**

- ☐ **.Master's Programme, Chemical Engineering for Energy and Environment, 120 credits Masterprogram, kemiteknik för energi och miljö.(See Appendix 3).**
- ☐ **Master's programme in Macromolecular Materials (in Fiber and polymer technology Division ).(Appendix 4).**
- ☐ **Master's programme in Molecular Science and Engineering (Appendix 5)**



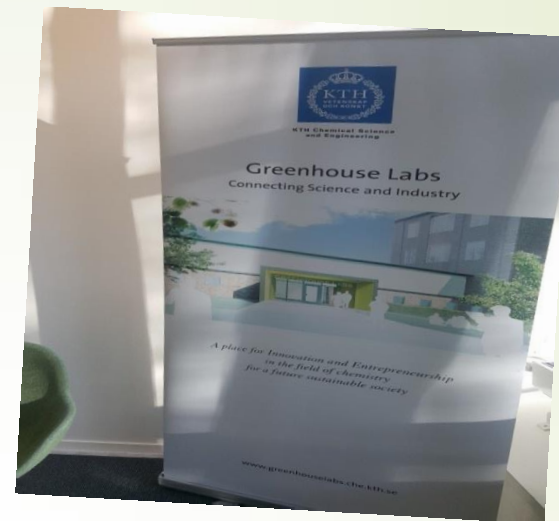
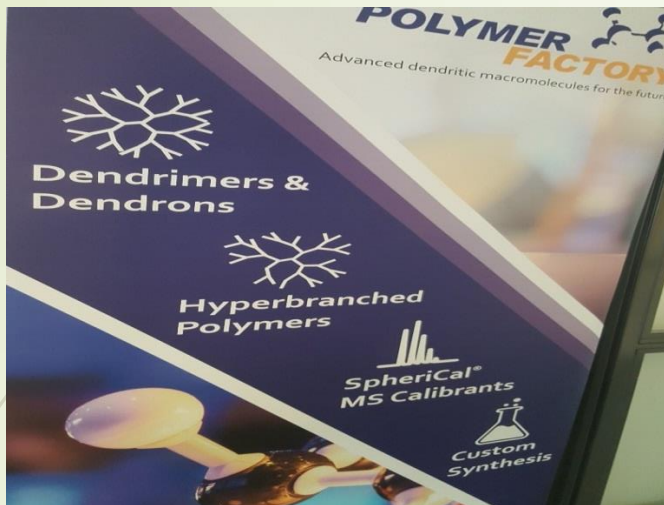






**(Mathew Fielden) Responsible for green house labs.**





The banners for company sharing works with green labs house



A sign for lab belongs to the company called dynamo (For dyes process)

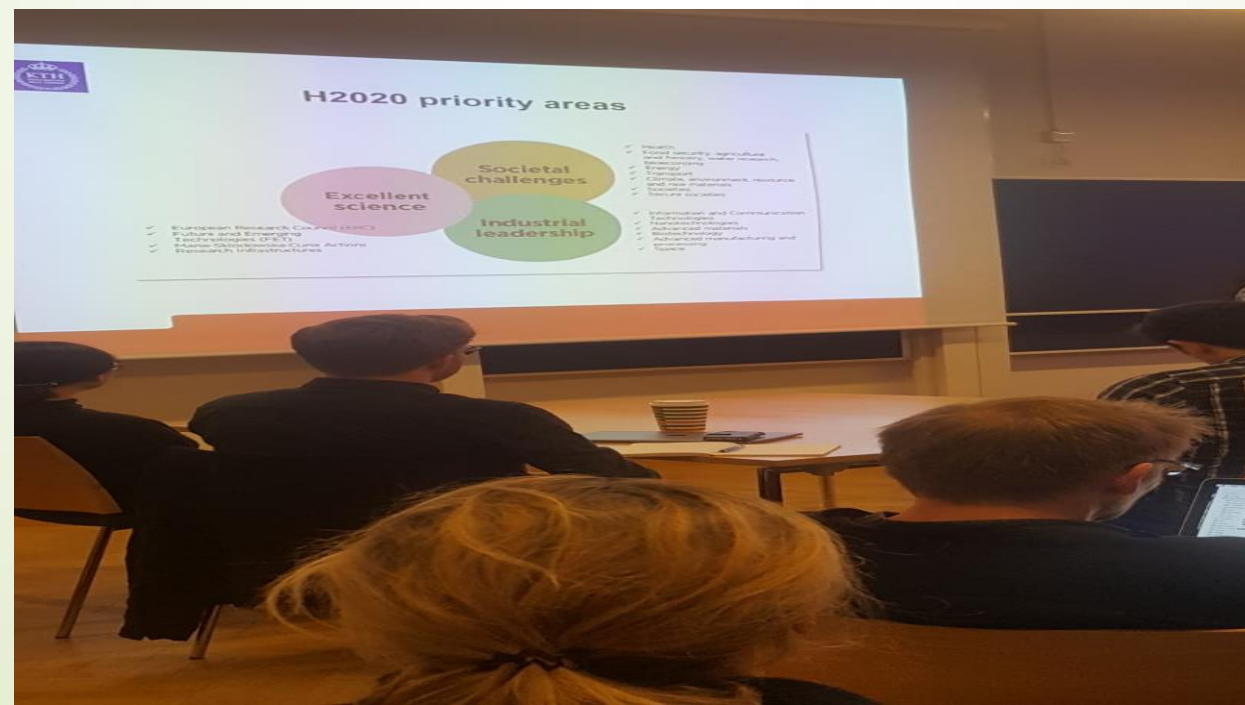


**KTH Bibliotheque:**



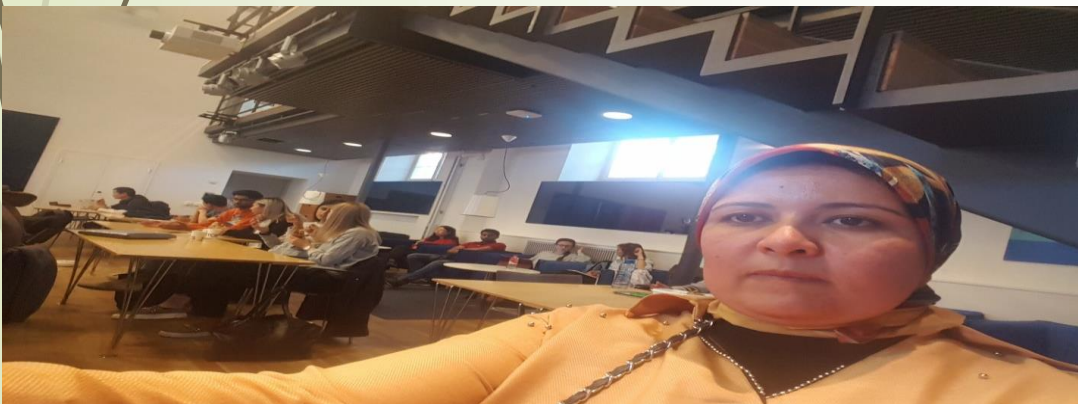
**Photos of the EU funding seminar**



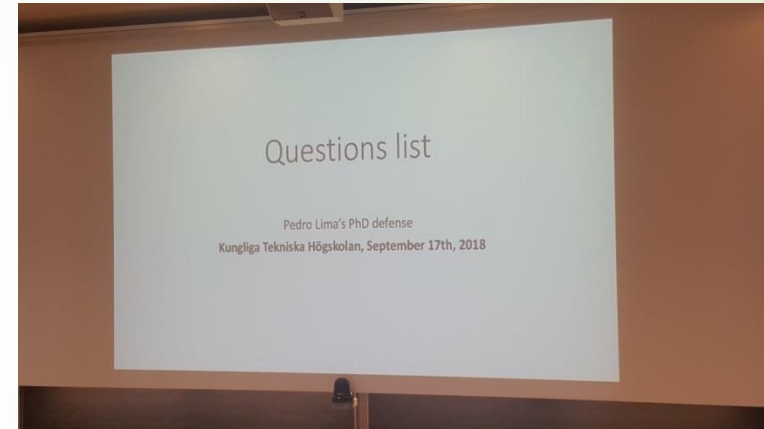
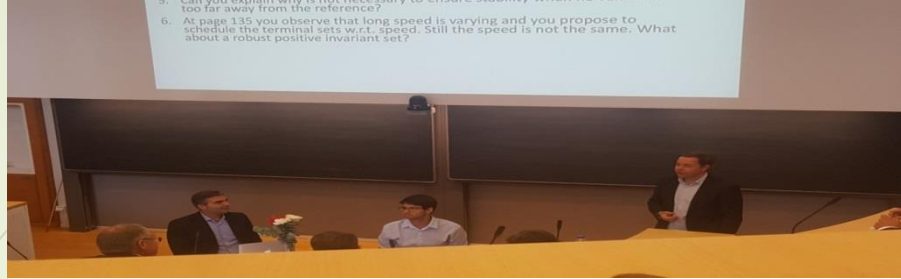




**in the library seminar to the students on career support (How you can plan you career).**







**: Attending a defense of Desertion of PHD studen**

## Conferences: on (18/9/2018):

### Attending part of conference on 2nd IGSHPA Research Track, Stockholm 2018



Attending part from Licentiate seminars

## Attending a conference on Energy: ENERGY SUMMIT 2018

The sponsors for this conference:

- ☐ Siemens
- ☐ Ferroamp.
- ☐ Insight Events.



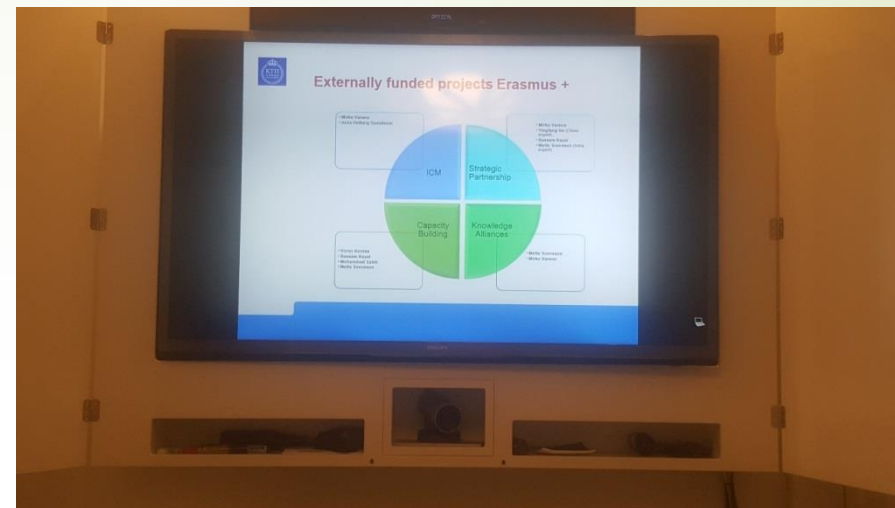
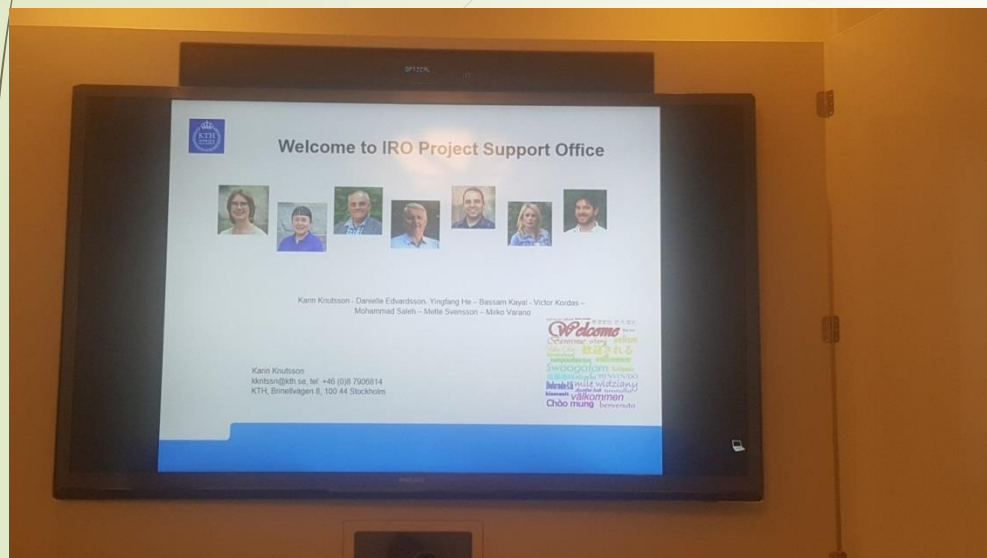








## A meeting with the head of International Relation Office of the KTH with





## Social and Daily life Aspects



Attending a social activity in the department of  
chemical engineering



**Cray fish party**



## Traditional of Swedish People : "FIKA):



### The benefits

- ☐ This visit gave me experience as it was considered my first visit in foreign universities.
- ☐ A new opportunity to know the members of the teaching staff at the university has a ranking at the level of the world (KTH) and especially in the department of fiber and polymer technology. A new opportunity also to collaborate in the research area of polymer Engineering with Prof. Mikael Hedenqvist “ the head of Polymeric materials Division “ in KTH.
- ☐ A good opportunity to attend lectures ,seminars,labs,work shops and get a good experience in methods of teaching.
- ☐ How students deal with faculty members and faculty members with each other
- ☐ Attends of two conferences one of them in KTH and the other one is ENERGY SUMMIT 2018.

### Drawbacks:

- I have no options for my accommodation and the price of it was too cost.
- When I arrived at the airport of Arland , I could not find anyone waiting for me to take me to the place of accommodation.No one from KTH coordinators give me a tour in Stockholm to show me the places in Stockholm city.

**Action plane (after visit to KTH):(To the department of Petrochemical Eng.):(starting from semester Fall 2018-2019)**

**(Polymer courses):**

- ❑ Collaboration with industry experts to give some lectures in the following courses Polymer Eng.I and plastics. (Sidpec and Ethydco companies).
- ❑ Upgrading the lectures in polymer Eng.I ,Polymer Eng.II ,fiber technology and plastics after attending most of this lectures in KTH.
- ❑ Introducing the course of Coating and rewriting the course description as an elective course after the visit to a prof.of coating technology in KTH.
- ❖ Upgrading of polymer labs in the department by ordering of buying some equipment as included in this report.
- ❖ Try to apply Modeling and simulation in polymer courses by software called Gromacs .



- ❖ The idea of introducing a project in the polymer Eng courses which will be discussed for each group of the student in front of examiner committee.
- ❖ Introducing some new experiments in the lab manual of polymer eng courses.
- ❖ Introducing some new assignments in the tutorial of the polymer eng.courses.
- ❖ Increasing site visit to the polymer companies.
- ❖ Develop a plan to achieve maximum benefit from visiting “Prof Mikael Hednqvist” the head of polymeric material in KTH to the university at the research level and educational level.(especially in postgraduate ).

**Chemical Eng. And Environmental Eng. Courses:**  
**General chemistry course:**

- ❖ **Introducing some ideas in the course of General chemistry to attract students (mass balance and energy balance are applied to basic units used in petrochemical industry).(by comparing the course content of general chemistry in KTH).**
- ❖ **The possibility of adding some new experiments in the lab manual of general chemistry course.**
- ❖ **The possibility of increasing the tutorial hours of this course.**
- ❖ **The possibility of introducing workshops in this course.**

### Other courses:

- ❖ Corrosion plays an important role in Engineering education and I suggest development of our corrosion course by comparing this with corrosion course in KTH and upgrading the Eng corrosion lab by full equipment in this field.
- ❖ Chemical Eng. Thermodynamics II which deals with properties need to be expanded and improvement. (compared to the KTH course of thermodynamics)
- ❖ We are in good shape in the following courses and labs:  
Organic chemistry.  
Plant design  
Inorganic chemistry.  
Unit operation.  
Chemical process.  
Environmental Eng.  
Chemical Eng. Thermodynamics I.
- ❖ Try to translate the course notes from Eng. Pedagogics Dept in KTH.



**General Remarks:**

- ❖ Proposal is made to build electronic workshop for fin instrumentation.
  - ❖ The possibility of building new space in the department for senior students to work in their ease to solve extended design problems.
  - ❖ Suggest building small library in the department.
- The idea of introducing a project in each course which will be delivered to the instructor before the end of this course and the outcomes of this project can be discussed in the presence of other professors from the department.
- ❖ The minimum lab hours 5 hours.
  - ❖ The minimum tut hours 3 hours.
- The idea of establishing Greenhouse labs in the University.



*Thank You*





# Petro Team



## Green Approach and Safer Alternatives to Toxic Flame Retardants for Polyurethane Foam

### Abstract

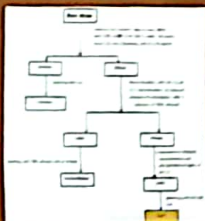
This project improved the properties of polyurethane, which is used in the manufacture of artificial leather, furniture, and textiles, by adding environmentally friendly, flame-retardant, natural materials that are more effective and inexpensive, making it safer and less flammable. He achieved promising and excellent results for improving mechanical and thermal performance

### Aim of the work

This project's goal is to develop an eco-friendly flame-retardant for polyurethane (PU) to mitigate hazardous fumes. We synthesized three flame-retardants: lipids (soybean oil and jojoba), eggshells ( $\text{CaCO}_3$ ), and lignin from rice straw. We characterized these materials with FTIR, TGA, and flame tests and assessed their mechanical properties using universal testing equipment.

### Experimental work

Lipids and cellulose are extracted using alkaline method



Preparation of polyurethane foam (PUF)



Schematic illustration of the preparation process of PUF



PUF cup cake



### Results

FTIR Test

Thermogravimetry Analysis

SEM Test



### Supervisors

- Dr. Aya Soliman
- Dr. Ashraf Morsy
- Dr. Hossam Anwer

### Team Members

- Marawan Ghreeb
- Sherif Khairallah
- Abdelrahman Soliman
- Rewan Ayman

### Achievements & Certifications

- Certification from the National Research Center, Department of Spinning and Weaving, to test the material on textiles
- 1st Prize Winner in the 2nd edition of the International Competition (Intra-Africa 2063)
- Winning the 1st place in Hult Prize Competition held in Pharos University in Alexandria
- 2nd Prize Winner in Hult Prize National Competition all over Egypt among 11 teams from 10 different universities (Powered by ISF)
- Qualified to the Hult Prize Global Competition among 700 teams all over the world in Tunis Summit
- Approval in the competition to grant support for graduation projects for engineering students from the Alexandria Engineers Syndicate

### Conclusion

- Our study successfully demonstrated the feasibility of developing flame retardants using sustainable natural materials, thereby reducing reliance on synthetic alternatives.
- Our experiments yielded optimum results, with complete suppression of flames, indicating the effectiveness of the flame retardants.
- The SEM analysis revealed that the best sample had improved homogeneity and reduced pore diameter, suggesting enhanced performance.
- In addition to flame retardancy, the developed materials also exhibited improved thermal stability and mechanical properties, making them potentially useful in various applications.
- The most effective flame retardant, as determined by the LOI test, achieved a rating of 23.5%, while the sample without flame retardant exhibited a rating of 18.5%, highlighting the significant improvement in flame retardancy achieved through our development.
- Overall, our findings suggest that our eco-friendly flame retardants have promising potential for use in various industries, particularly those requiring enhanced fire safety measures.

