



# The Instructor's Bio

Instructor Name: [Amjad El-Qanni](#), PhD

**2013 - 2018: *PhD***, Chemical and Petroleum Engineering, Specialty of Energy and Environment, University of Calgary, Calgary, Canada. ***Thesis:*** *Development of Sustainable Nanosorbents Based Technology for Hydrocarbons and Organic Pollutants Recovery from Industrial Wastewater.*

**2010 - 2012: *MSc***, Sciences and Techniques of Urban Environments, specialty of Atmosphere, Water and Urban Environments, École Centrale de Nantes, Faculty of Engineering, Nantes, France. ***Thesis:*** *Utilization of Metal Oxide Nanoparticles for Adsorptive Removal and Subsequent Oxidation of Different Organic Pollutants from Wastewater.*

**2004 - 2009: *BSc***, Chemical Engineering, An-Najah National University, Faculty of Engineering, Nablus, Palestine.

***Graduation project:*** *Powder Detergent Production by Spray Dryer Process.*

**Contact Information:** [a.elqanni@najah.edu](mailto:a.elqanni@najah.edu), Engineering Building (11) Room # 2660.



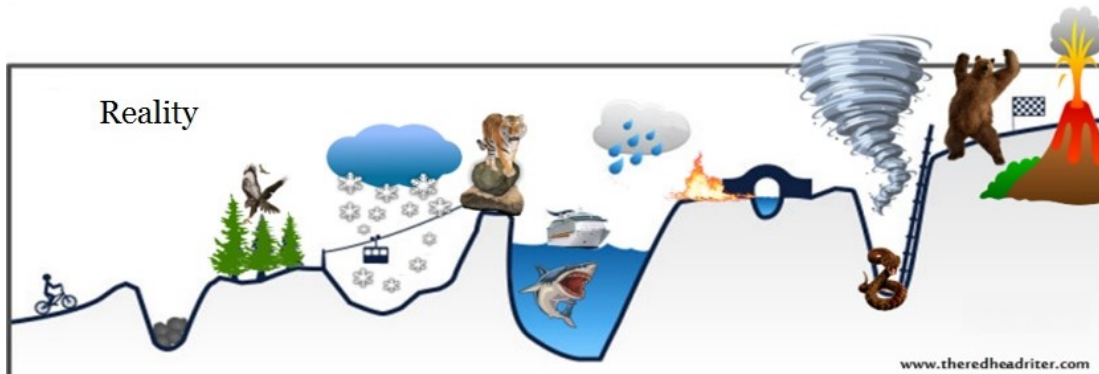


# The Academic Life

My Plan



Reality



www.thereadriter.com

PRO

YOU CAN WORK WHENEVER  
YOU WANT! EVERY DAY  
IS A SATURDAY!



JORGE CHAM © 2017

CON

YOU WORK ON SATURDAYS.



WWW.PHDCOMICS.COM



# Research Field: Alberta's Oil Sands



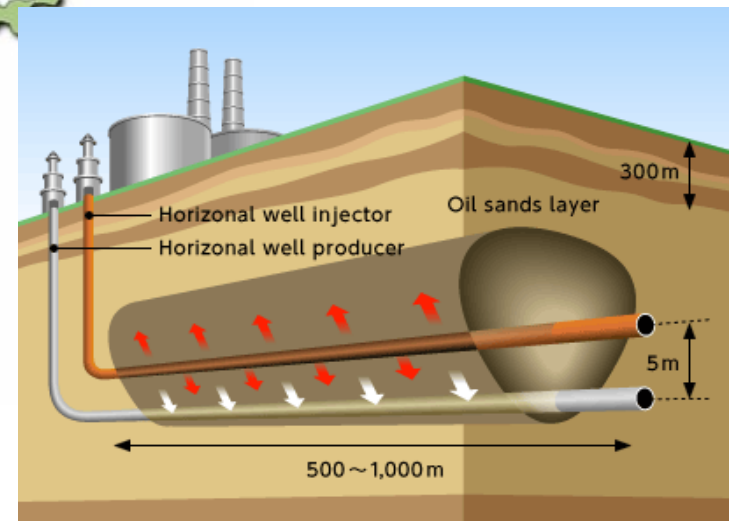
**SAGD**

**In-situ recovery & upgrading**



**Surface mining**

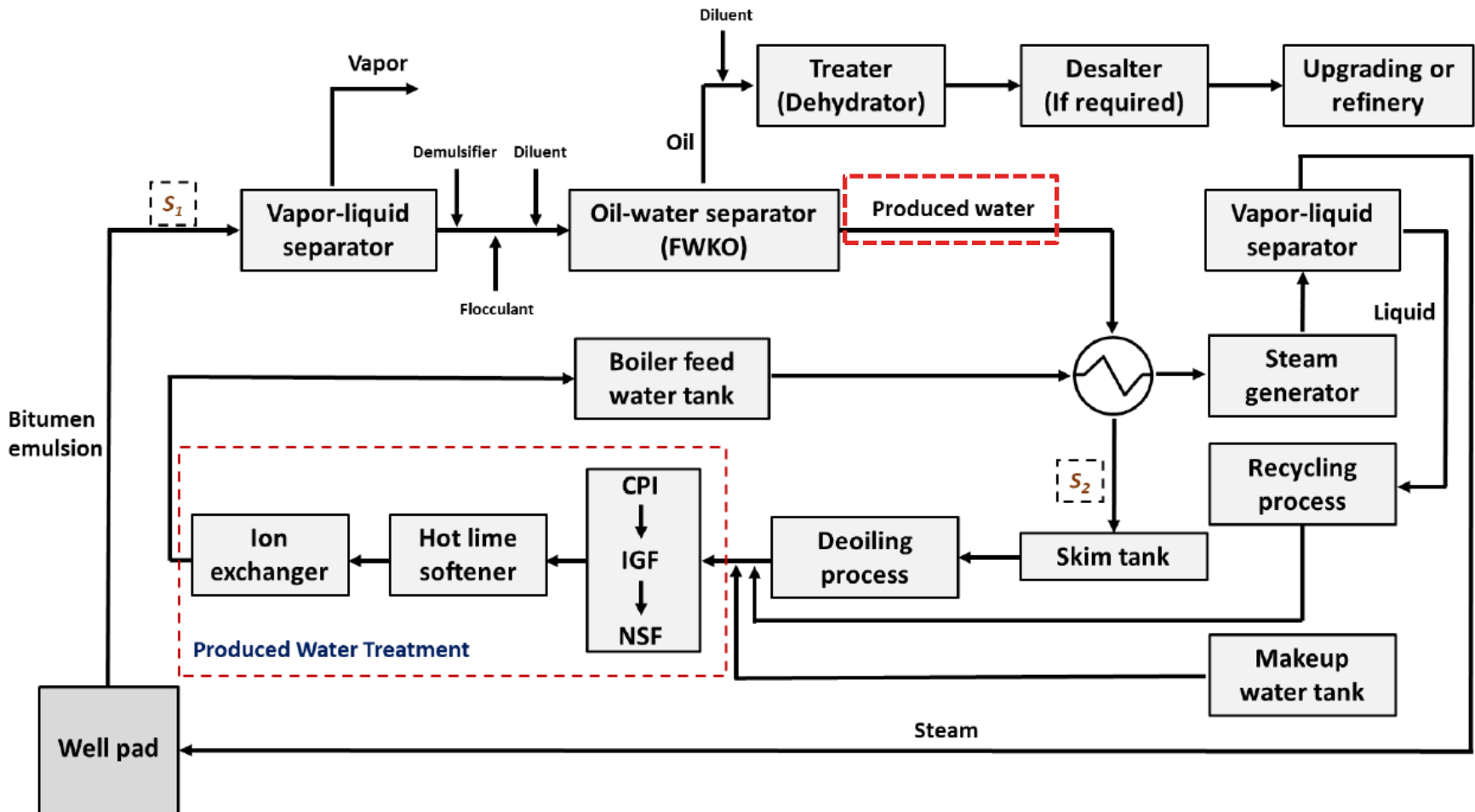
**Ex-situ recovery & upgrading**





# Main Objective

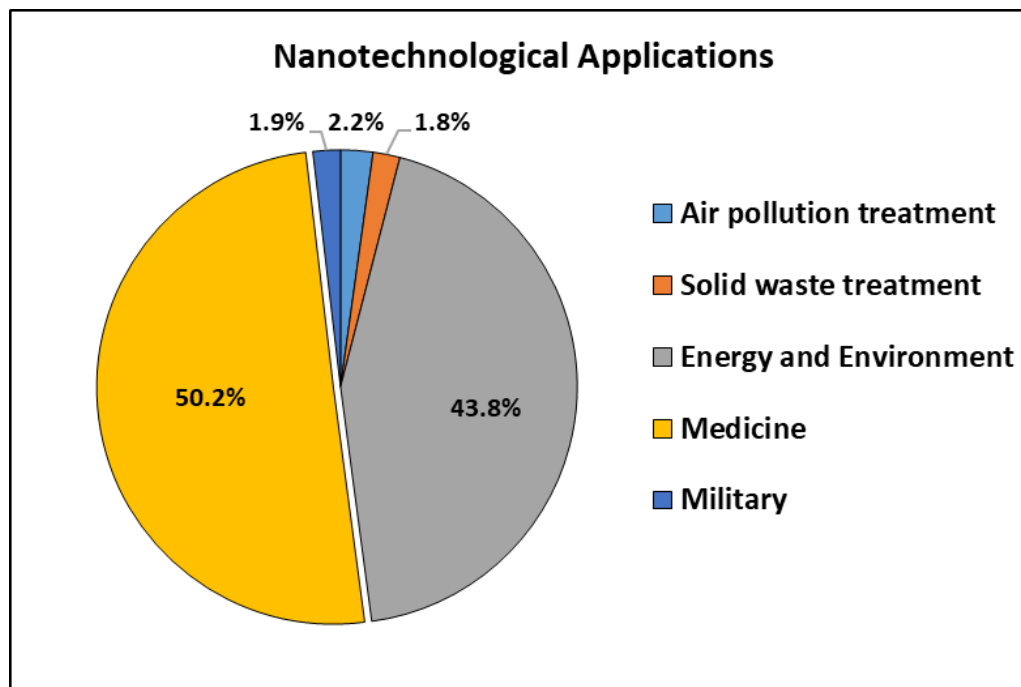
- Improve the produced water recycling efficiency for reuse in a steam generation by developing a process that is affordable and easy to integrate with the existent ones.





# Nanoparticle Technology

- **Nanotechnology** is a field of applied science, focused on the design, synthesis, characterization and application of materials and devices on the nanoscale.



- Literature references focused on nanotechnology applications in 2016 (extracted by SciFinder®, copyright© 2016 American Chemical Society).





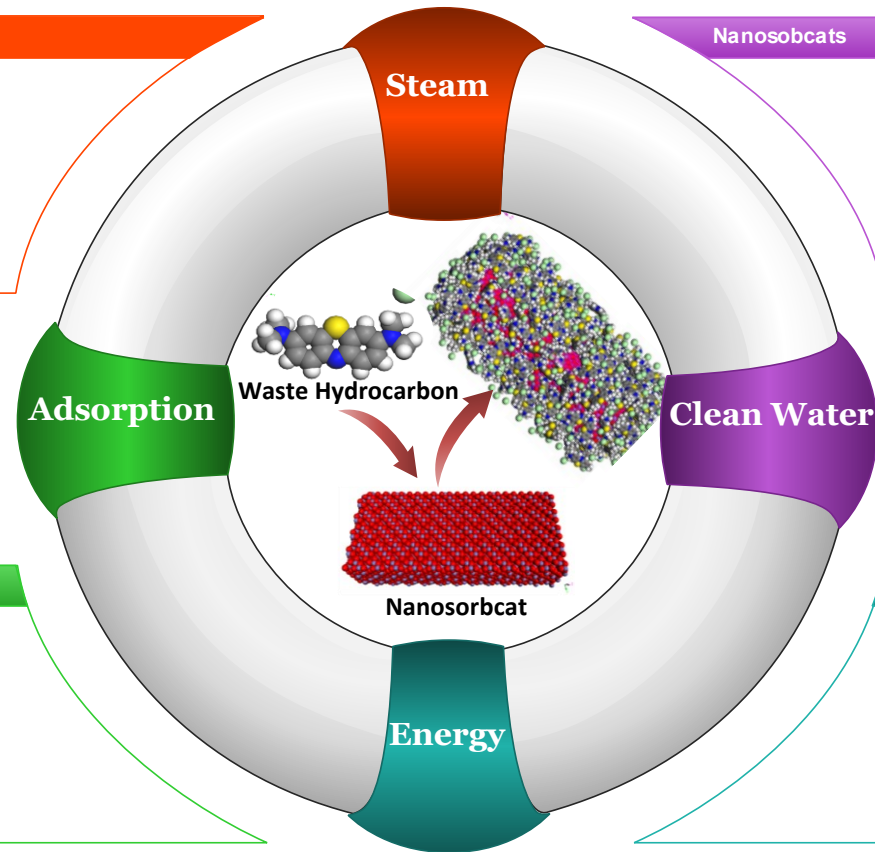
# Big Picture

## Problem: Industrial Wastewater

- Organic pollutants present in industrial wastewater pose a real environmental and energy conservation challenges worldwide.
- Current treatment technologies focus on water recycling at high capital and operating costs.

## Our Sustainable Solution Approach

Our futuristic vision is developing hydrocarbon waste utilization process by transforming “energy consuming” to “energy producing” wastewater treatment process by using the right nanosorbcat.



## Nanosorbcat

- Nanoparticles have high, active, and hybrid surface areas, which make them able to work as nano-adsorbents and catalysts (nanosorbcat).
- This recent concept is invented, for the first time, by our research group.

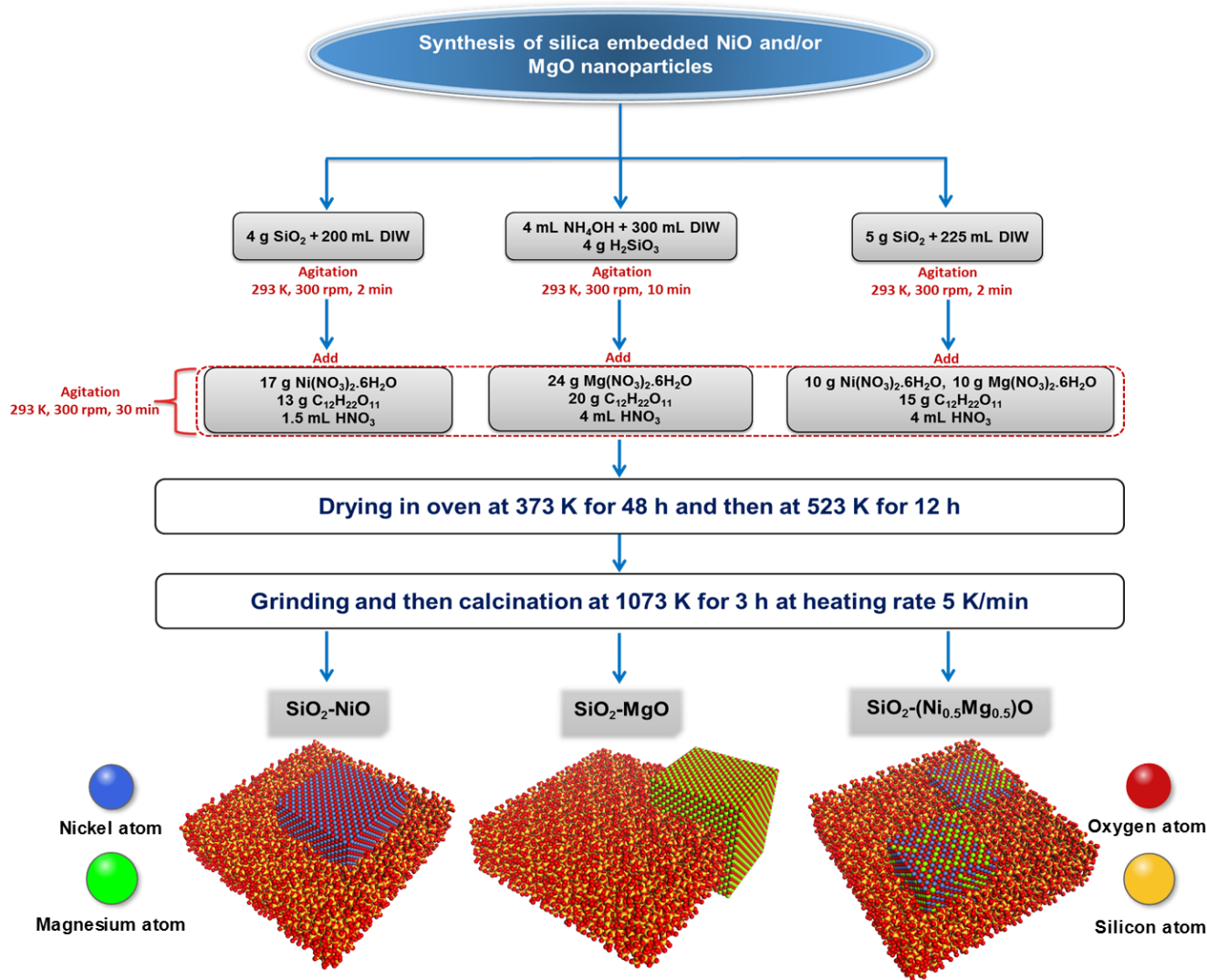
## Synthetic and Real Wastewater Effluents

Functionalized silica-based nanosorbcat were successfully prepared and employed in removing different pollutants with different functionalities (cationic, anionic, neutral, and organic acids), in addition to real effluents like SAGD and textile wastewaters.

***“If you want to make something dirt-cheap, make it out of dirt. Preferably dirt that’s locally sourced.” Prof. Donald Sadoway, Materials Chemistry, MIT.***



# In-house Prepared Nanosorbents



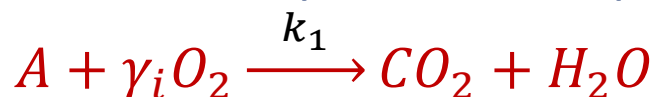


## Chapter 5 Findings: Oxy-cracking

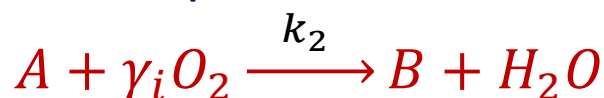
- Over all oxidation (oxy-cracking) of the organic compounds:



- For complete or deep oxidation:

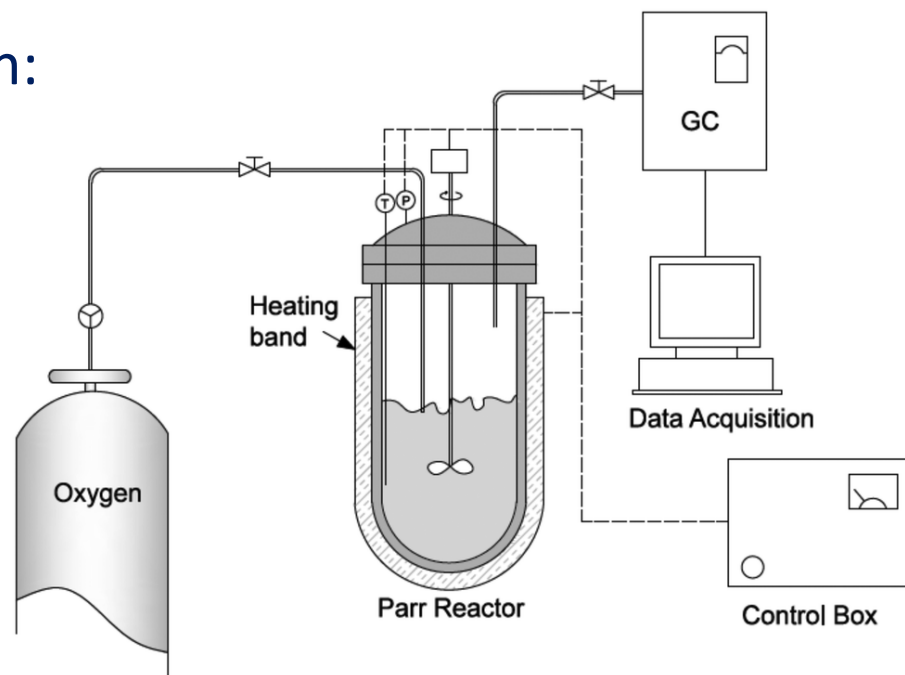


- For partial oxidation:



Lumped kinetic model (LKM):

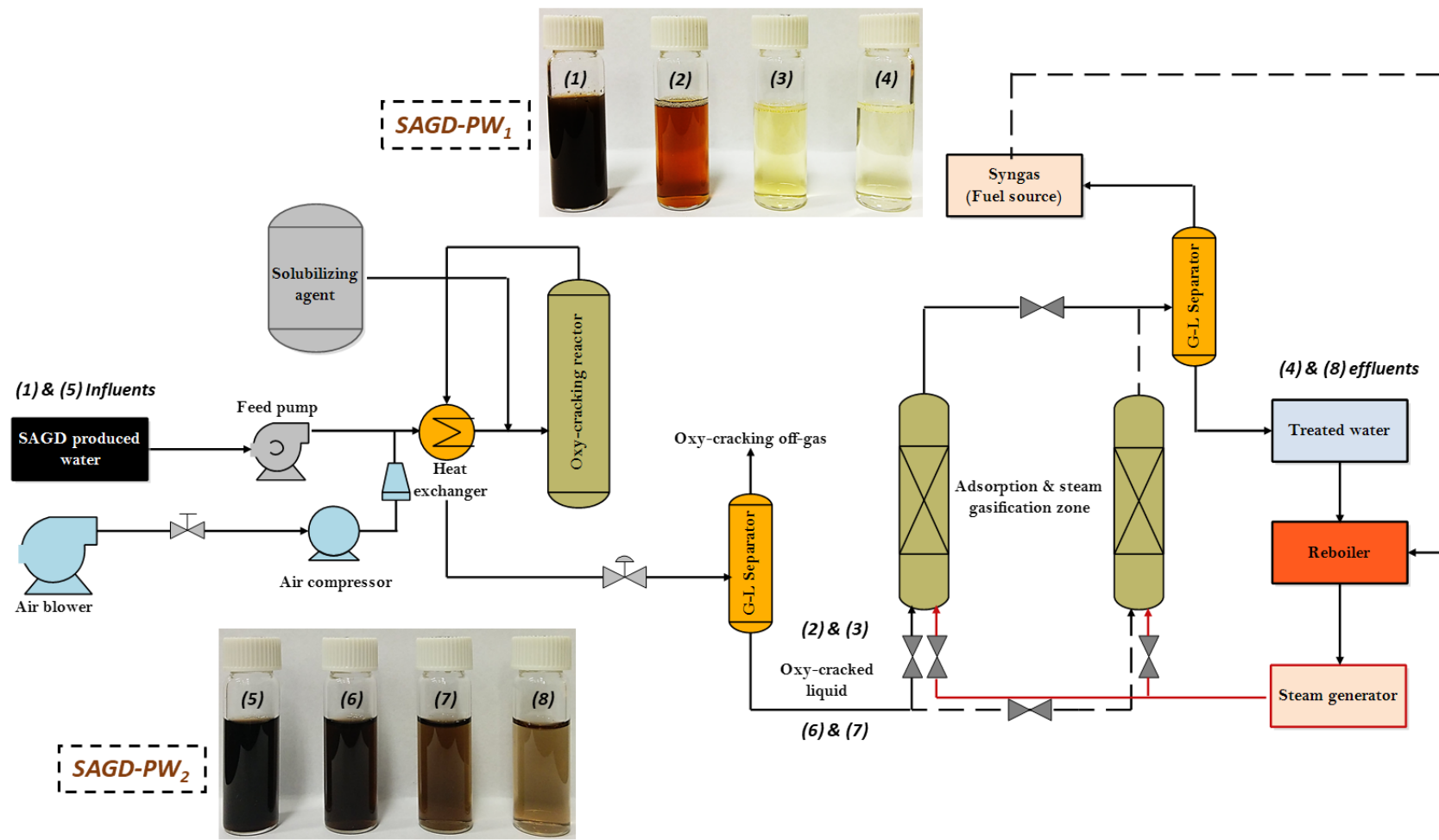
$$\frac{[TOC]}{[TOC]_0} = \frac{k_2}{k_1 + k_2} + \frac{k_1}{k_1 + k_2} e^{-(k_1 + k_2)t}$$



Schematic illustration of the experimental setup (not to scale)



# Proposed Technology





# Introduction to Scientific Research (469691)

## Course Outline

### ■ MSc Graduate Program:

- Electrical Power Engineering.
- Clean Energy and Energy Conservation Engineering.

### ■ Course Content:

- This course provides an opportunity for graduate students to establish or advance their understanding of research through a critical exploration of **research language, ethics, and approaches**.
- The course introduces the language of research, ethical principles and challenges, and the elements of the research process within **quantitative, qualitative, and mixed method approaches**.
- Students will use these theoretical underpinnings to begin to **critically review literature** relevant to their field or interests and determine how research findings are useful in forming their understanding of their work, social, local and global environment.



# Course Outline

## Intended Learning Outcomes (ILO's)

- At the end of this course, the students should be able to:
  1. Understand some basic concepts of research and its methodologies.
  2. Identify appropriate research topics.
  3. Select and define appropriate research problem and parameters.
  4. Prepare a thesis proposal and literature review.
  5. Organize and conduct research in a more appropriate manner.

## Textbook and/ or References

- The class notes, slides, and videos are the main sources of information for this course.



# Course Outline

## Assessment Criteria

Assessment Criteria	Percent (%)
Assignment/Activity #1	20
Assignment/Activity #2	20
Assignment/Activity #3	20
Assignment/Activity #4	20
Assignment/Activity #5	20

- This is a Pass/Fail course. However, you must conduct and submit **all assignments/activities** to pass the course.



# Course Outline

## Course Topics and Plan

- Lecture 02: Applied research:
  - Definition of research and the common practice of conducting applied research.
  - Why it is important for a master student to conduct a research in a good way and what is the master research?
- Lecture 03: Research database:
  - Journals
  - Publishers
  - Indexing bodies
  - Conferences



# Course Outline

## Course Topics

- Lecture 04: How to publish a good research article in a good journal?
  - The peer review process.
  - Review, editors, managing editors and online submission system (Elsevier, IEEE, ACS, RSC, etc.).
- Lectures 05-07: Research paper components.
- Lectures 08-10: Thesis components and formatting.
- Lecture 11: Thesis defense.
- Lecture 12: Similarity and plagiarism.
- Lectures 13 – 15: Research topic presentations and proposals.
- Lecture 16: Motivational movie/video.



# Publish or Perish

## Publish or Perish



"He didn't publish, so he perished."

[\(Source\)](#)



© Robin Reed  
robin@barstowproductions.com

[\(Source\)](#)