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 Nanosorbcats 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*.

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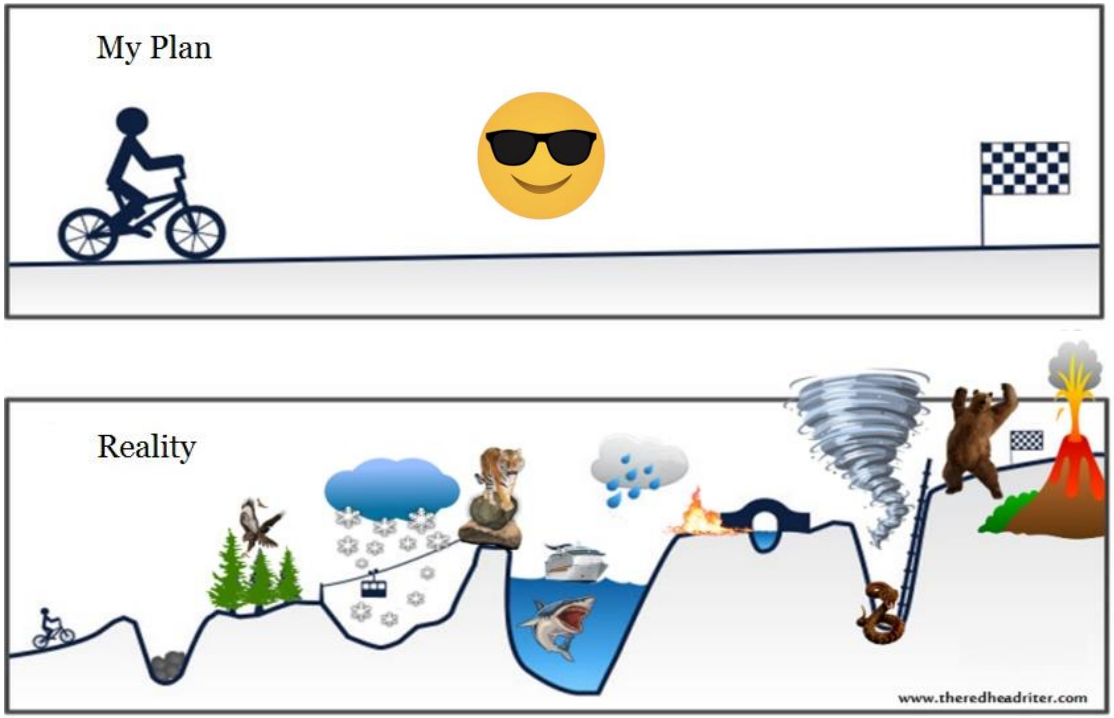
UNIVERSITY OF CALGARY

CENTRALE NANTES

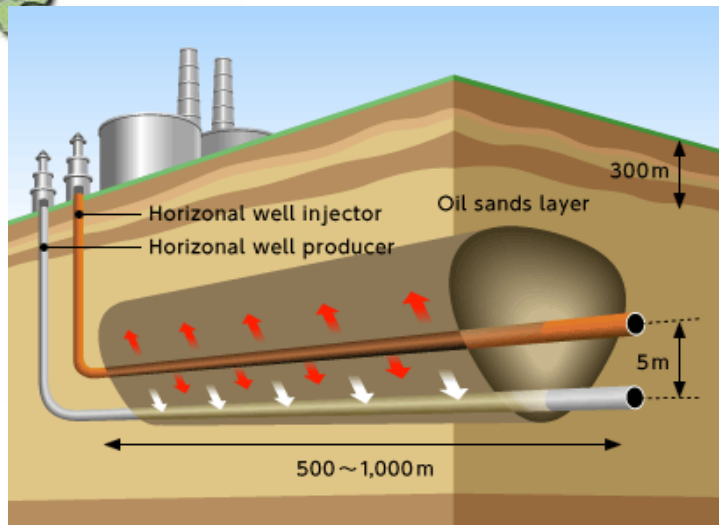
The Academic Life



Research Field: Alberta's Oil Sands

Surface mining
Ex-situ recovery & upgrading

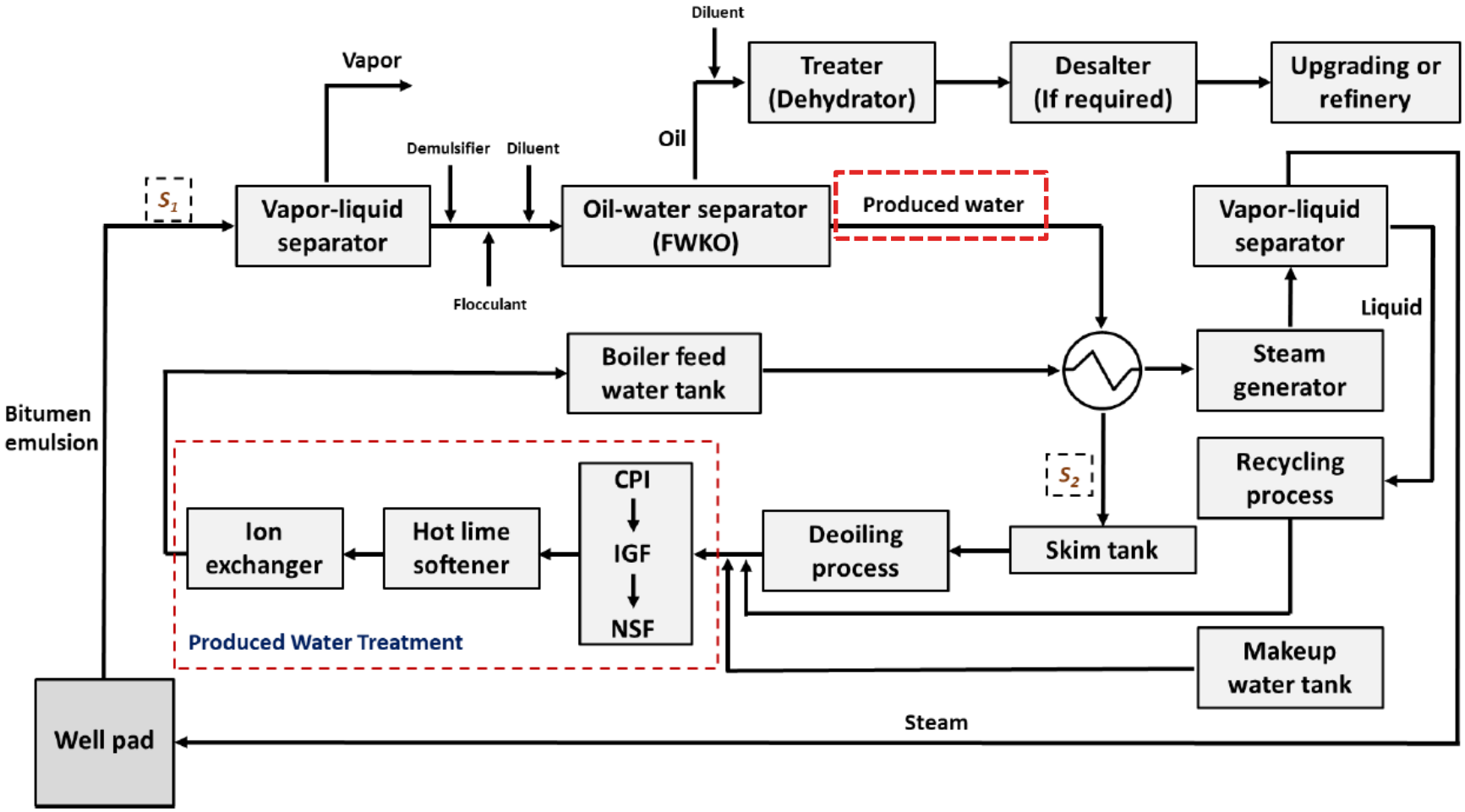
SAGD
In-situ recovery & upgrading



Source: *http://wirelessroadwarrior.blogspot.ca/2008/10/syncrude-and-athabascan-oil-sands.html*

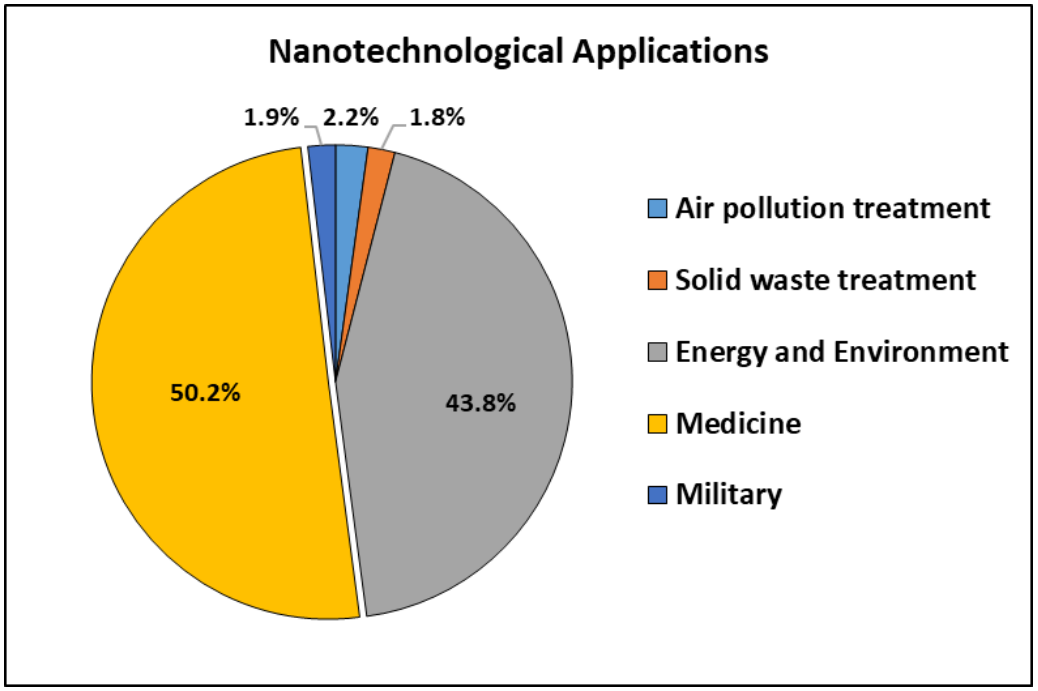
Main Objective

- 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).

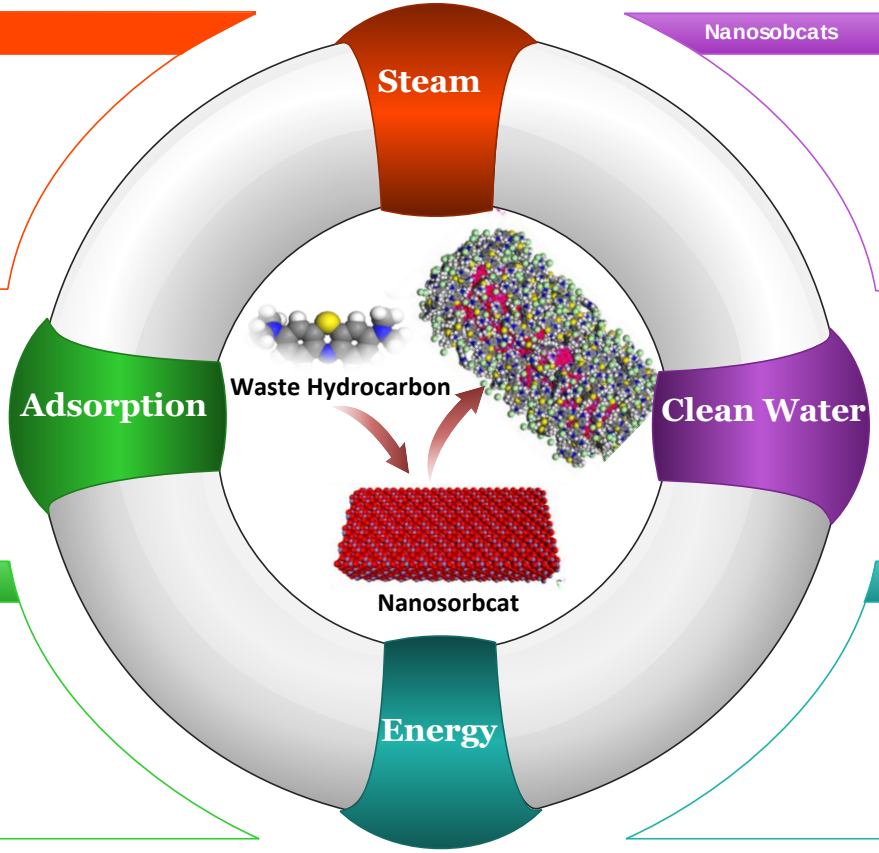
Big Picture

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.

Nanosobcats

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



Our Sustainable Solution Approach

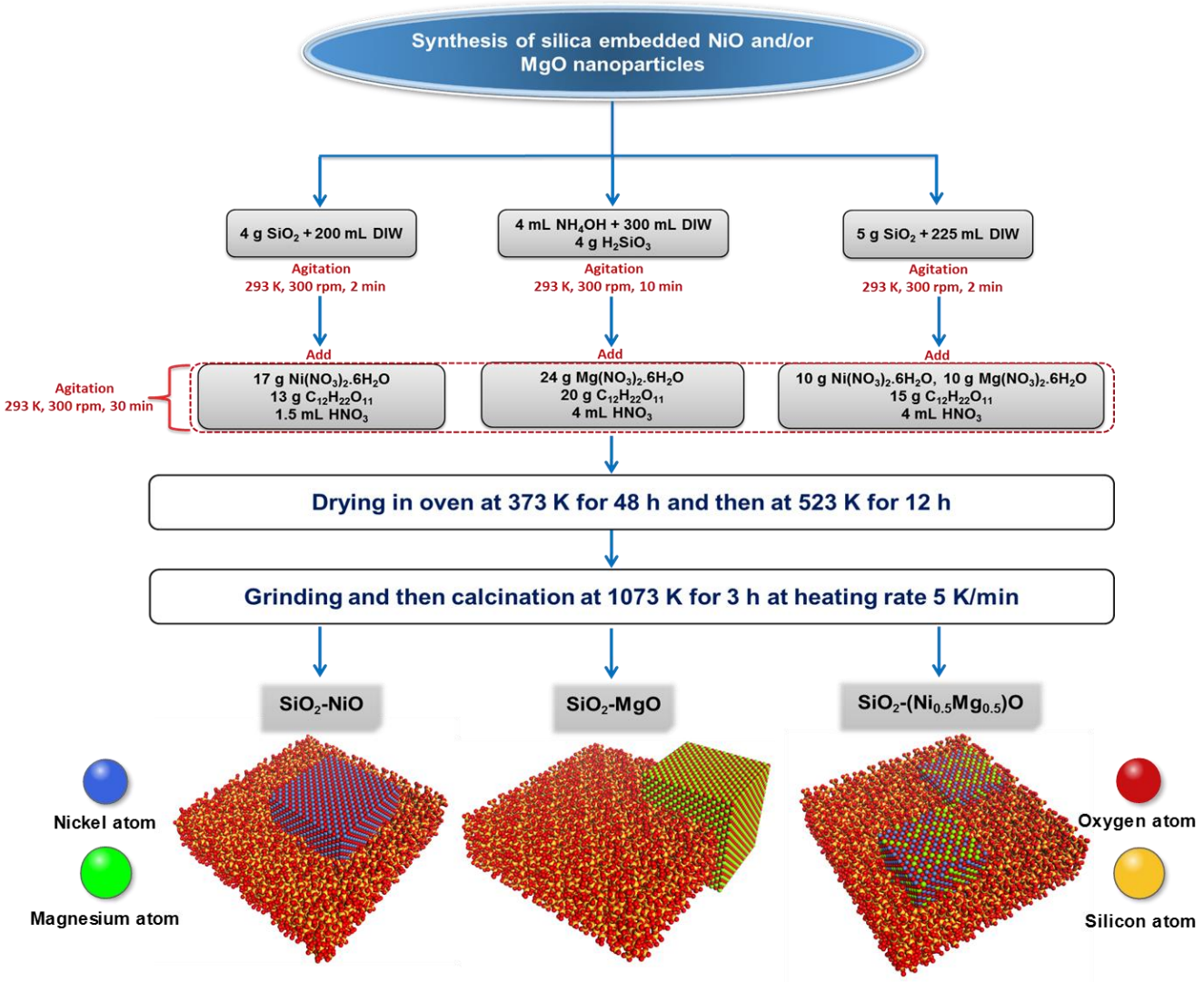
Our futuristic vision is developing hydrocarbon waste utilization process by transforming “energy consuming” to “energy producing” wastewater treatment process by using the right nanosrobcats.

Synthetic and Real Wastewater Effluents

Functionalized silica-based nanosorbcats 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 Nanosorbcats



El-Qanni, A., N.N. Nassar, and G. Vitale, A combined experimental and computational modeling study on adsorption of propionic acid onto silica-embedded NiO/MgO nanoparticles, Chemical Engineering Journal, 327 (2017) 666-677.

Chapter 5 Findings: Oxy-cracking

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

$$A + \gamma_i O_2 \rightarrow B + CO_2 + H_2O$$

- For complete or deep oxidation:

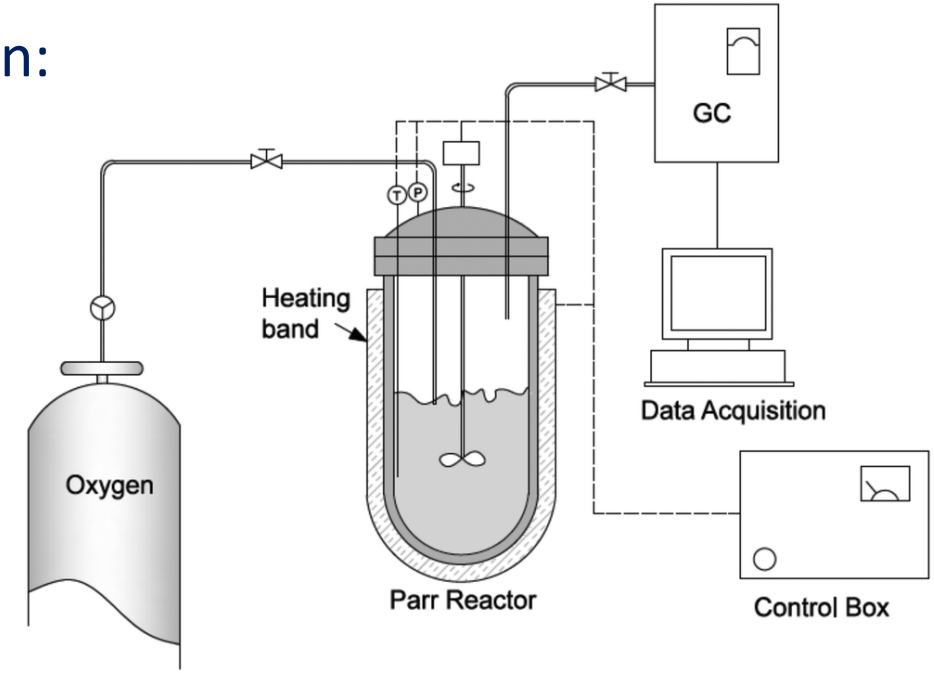
$$A + \gamma_i O_2 \xrightarrow{k_1} CO_2 + H_2O$$

- For partial oxidation:

$$A + \gamma_i O_2 \xrightarrow{k_2} B + H_2O$$

Lumped kinetic model (LKM):

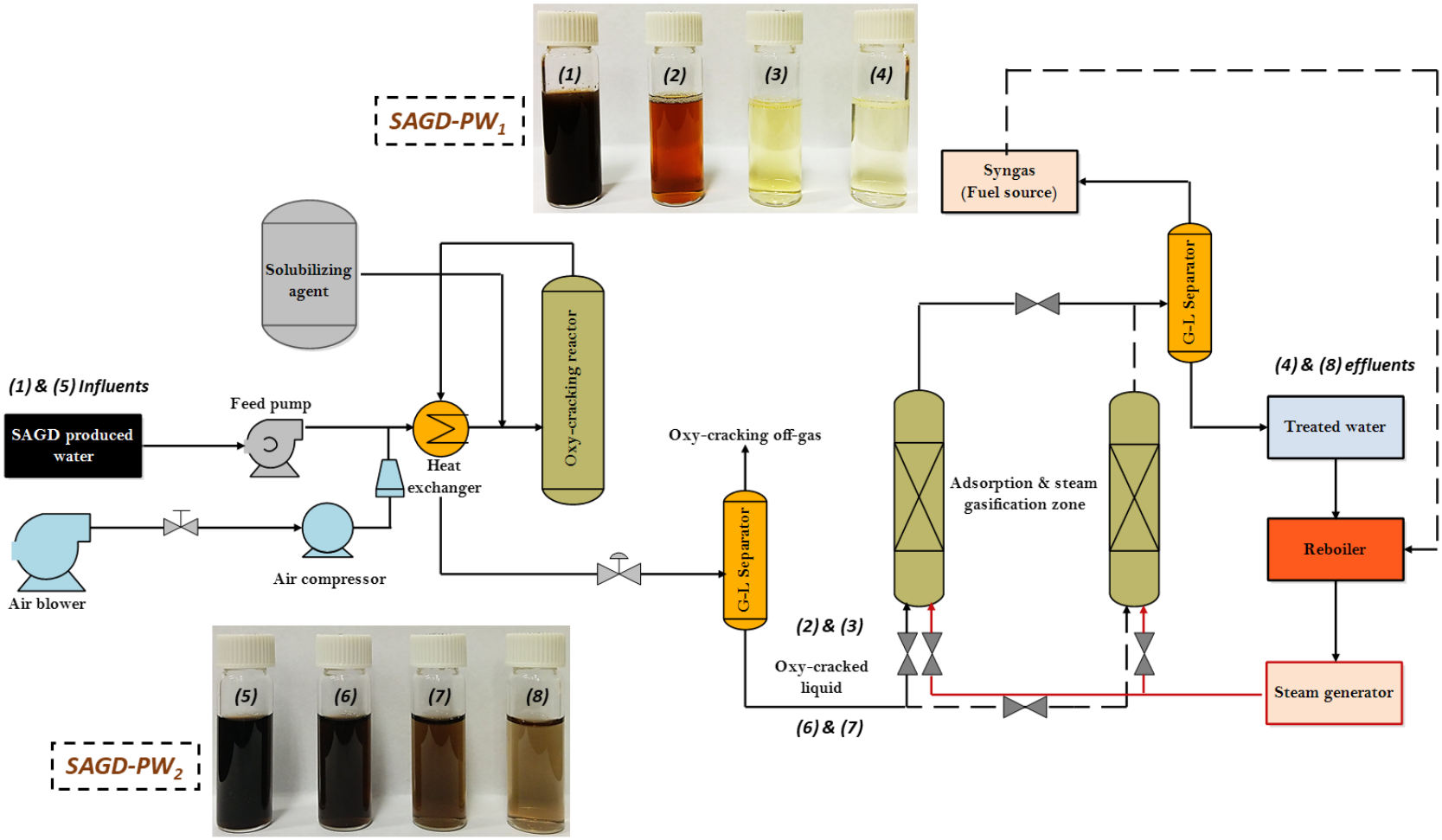
$$\frac{[TOC]}{[TOC]_O} = \frac{k_2}{k_1 + k_2} + \frac{k_1}{k_1 + k_2} e^{-(k_1 + k_2)t}$$



Schematic illustration of the experimental setup (not to scale)

Manasrah, A.D., ***A. El-Qanni***, I. Badran, L. Carbognani Ortega, M.J. Perez-Zurita, N.N. Nassar, Experimental and theoretical studies on oxy-cracking of Quinolin-65 as a model molecule for residual feedstocks, Reaction Chemistry & Engineering, 2 (2017) 703-719.

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

(Source)

(Source)