



Dr. Ahmed RASSILI

He earned his PhD in theoretical physics at the University of Liège, and conducted his carrier on R&D in both departments of electrical engineering and aerospace and mechanics as a postdoc then a research director and associate professor on advanced manufacturing. He gains a teaching experience working at the University of Liège, the German University of Technology in Oman (RWTH) and EUROMED University, dealing with applied thermodynamics, fluid dynamics, thermal power stations and manufacturing processes for the automotive sector. Since 2016, he started a new carrier in business development in research center mainly focusing on advanced manufacturing, recycling and waste valorization sectors, including other activities such as zero waste, circular economy, energy efficiency and digitalization. Ahmed Rassili has developed a well-known experience and grant management in European funding programs such as ERANET, H2020 and Horizon Europe, European Cooperation in Science and Technology (COST actions) member

Syllabus

Courses description

Weekly Schedule of Course Topics covered and Out of Class Assignments



Integrated Solid Waste Management: The case of metals

Human activities generate a huge amount of waste and the worst scenario of doing nothing to change our habits, will lead to ecological and environmental disaster and the extinction of many earth resources by the middle of the century. A more optimistic scenario is wished and will guide to improve natural resources use and prevent from the above-mentioned disasters. One the proposed solutions is an integrated waste management.

In many countries waste management policies have evolved from open dumping to safe disposal, further to recycling and waste-to-energy or waste-to-material conversion, commonly called, urban mining. The course will present the case of metals for which and related activities in a sustainable oriented approach. Recovery of metals will be presented in direct industrial collection as well as from municipal incinerators when up streaming solutions are not possible before incineration processes. The course will conclude with two examples of the most common used metals as Aluminium and Steel.

Solutions for metals sustainability providing economic, environmental, social and technological impacts will also be addressed.

The course will be composed a follow:

A/ General introduction to solid waste management (In collaboration with other colleagues)

B/ Life-cycle thinking, sustainability aspects and circular economy

C/ Metals recovery for recycling and circular economy

D/ Recovery of metals from waste incinerator bottom ash

1. Introduction

2. Basics of Municipal Waste Incineration

3. Metals in Municipal Waste Incineration

4. Equipment for Processing Bottom Ash

5. Bottom Ash Processing

6. Sampling and Analysis

7. Economics of Metal Recovery from MWI Bottom Ash

Metals recycling:

I - Aluminum case

1. Fundamentals

a. Aluminum history & applications (automotive, packaging fields...)

b. Aluminum alloys (Nomenclature, element roles, tramps, cast/wrought)

c. Market trends

2. Primary Al production from bauxite

a. Bayer process (alumina production)

b. Heroult & Hall process (aluminum production)

3. Secondary Al production

a. Pre-processing (shredding, sorting, compaction)

b. Furnace types (RTF, reverberatory furnaces...)

c. Environmental issues

4. Aluminum recycling in practice

II - Steel case

Delivery & Duration

Online Classes | Bachelor/Master/PhD | 3 Months : 2 hrs/Week

Who this programme is for

Graduate students (Bachelor, Master, PhD)

Certificate

Certificate of Completion from VLU/Prof. Hassan El Bari

Media Tools

Virtual courses / Zoom management by Sabaek for Education & Training (Bahrain)

Program Learning Outcomes (PLOs)

Understand the requirements of a systematic change and technical possibilities of industrial, processes and systems to minimise environmental impacts, mainly in metallic manufacturing sectors;

Acquire competence in applying theories to enable the shift from a linear to a circular economy;

Develop solutions for metals sustainability providing economic, environmental, social and technological impacts.

Application Deadline

Send an e-mail to _____ to receive zoom invitation