Biofuel systems

Component
École Nationale Supérieure d'Électrotechnique d'Électronique

In brief

- **Code:** N9EE36B
- **Open to exchange students:** No

Presentation

Description

Introduction to biofuels :

1st generation bioethanol sector:

- Properties and uses of fuel ethanol

- Production process by sector: General diagram, fermentation, feedstock preparation, ethanol separation, prospects for improvement

- Energy and environmental balances

- Sector development (France, Europe, Worldwide)

Biodiesel :

- General data: physical chemistry, standards, reminder of world and European production, production sites.

- raw materials and their preparation.

Non-contractual information.
Last update on 27 June 2025

Chemistry and processes, basic catalysis (Lurgi), heterogeneous catalysis (EsterFIP), introduction to the HVO process.

Biogas :

- Generalities and Production: Biogas, CNG, Biogas fuel

- Biological transformations and processes

- Environmental and economic balances compared with other uses

Biocatalyzed energy systems: biopiles and microbial electrolysers

Historical background: from research to economic reality for niche markets
Two families of biopiles:
Microbial cells
Enzymatic cells
Hydrogen production by microbial electrolysis

The role of research in the production and use of bioethanol and biodiesel, in relation to energy and environmental aspects

Introduction sur les enjeux des filières biocarburants
Le rôle de la recherche pour la production de bioéthanol
Les biocarburants « deuxième génération »
Innovation dans le domaine des procédés de production
Concept de bioraffineries
Le rôle de la recherche pour la production de biodiesel
Innovation en matière de raffinage et de transformation des huiles végétales
Diversification des matières premières
Adéquation entre motorisation et carburants oxygénés
Bilans énergétiques et environnementaux

Pre-requisites

Basic scientific knowledge: knowing how to interpret a graph, manipulating orders of magnitude, understanding quantities such as yields or balances, notions of processes, bibliographical research, etc.

Non-contractual information.
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