

Vak: Theory Thermo Chemical Conversion

credits: 3

Vakcode	ZWVH20TCC	Werkvormen	Werkvorm 1
Naam	Theory Thermo Chemical Conversion	Toetsen	Theory ThermoChemical Conversion - Schriftelijk, organisatie tentamenbureau
Studiejaar	2020-2021		
ECTS credits	3		
Taal	Engels		
Coördinator	A. Perl		

Leeruitkomsten

To have demonstrated knowledge and understanding of

- Chemistry to calculate the thermodynamic outcome of various (bio-) chemical reactions.
- Distinguishing the many choices in biological conversion processes
- The practical challenges that influence availability and reliability of a plant
- Unit operations that are required for a given process

To be able to

- Make mass and energy balances in biological conversion processes
- Set up a biological conversion experiment (e.g. anaerobic digestion or photo bioreactors)
- Model a biofuel production plant and calculate energy conversion efficiencies
- Contribute to discussions with experts

Inhoud

Basic properties of biomass feedstocks- and -derived energy carriers

- Organic and inorganic compositions of raw and mechanically/thermally upgraded lignocellulosic biomass
- Physical properties of raw and mechanically/thermally upgraded lignocellulosic biomass energy carriers
- Suitability of different biomass types for specific thermochemical processes

Basics of thermochemical conversion processes:

- Torrefaction
 - dry/wet
- Pyrolysis
 - fast/slow
- Gasification
 - direct/indirect
 - producer gas purification and upgrading to various qualities
- Combustion
 - direct/air-staged
 - for heat and/or power generation
- Typical temperature levels, scales and overall mass/energy efficiencies
- Compositions of typical flue-, process- and producer-gasses, including by-products, impurities and emissions

Specific technology solutions for pyrolysis, gasification and combustion:

- Grate-fired/fixed/moving bed systems
- Fluidised-bed systems
- Pulverised-fuel systems
- Typical technical bottlenecks and solutions to overcome those for each specific technology solution

The technological maturity and the role in the current and (potential) future heat and power market.

Opgenomen in opleiding(en)

European Master in Renewable Energy

School(s)

Instituut voor Engineering