

## Vak: Theory Thermo Chemical Conversion

credits: 3

<b>Vakcode</b>	ZWVH20TCC	<b>Werkvormen</b>	Werkvorm 1
<b>Naam</b>	Theory Thermo Chemical Conversion	<b>Toetsen</b>	Theory ThermoChemical Conversion - Schriftelijk, organisatie tentamenbureau
<b>Studiejaar</b>	2020-2021		
<b>ECTS credits</b>	3		
<b>Taal</b>	Engels		
<b>Coördinator</b>	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

**share your talent. move the world.**