Funded by the European Union

THE ELECTRIC DECADE

Discover how electrification technologies support the EU's climate goals

1st JOINT ONLINE WORKSHOP of Horizon Europe projects

17th of January 2024 | 9.00- 12.00 CET

Joint workshop – Q&A

AGENDA

item	speaker	starting time	duration
Participants welcome		08:45	00:15
Introduction to the workshop, objectives of the day	Joris Thybaut, Univ. Ghent	09:00	00:05
How electrification can help meeting the circularity goals?	Franz Hörzenberger, Arcelor Mittal	09:05	00:15
Electrification technology	Walter Vermeiren, TOTB	09:20	00:15
e-CODUCT	Gleb Veryasov, TOTB	09:35	00:15
ERETECH	Gianluca Pauletto, SYPOX	09:50	00:15
eQATOR	Richard Heyn, SINTEF	10:05	00:15
break		10:20	00:10
TITAN	David Farrusseng, IRCE Lyon	10:30	00:15
STORMING	Patricia Benito Martin, University of Bologna	10:45	00:15
Panel / round table	Georgios Stefanidis and speakers	11:00	00:30
Discussion: more promising technologies, Q&A	Joris Thybaut, Univ. Ghent	11:30	00:30
		12:00	

QUESTIONS & ANSWERS

ERETECH

For Sypox, are the conductive wires not too much affected by corrosion by reaction species ?
A: No, we never observed experimentally any corrosion effect on the wires. Indeed, in the conditions we operate our reactors the atmosphere does not results to be corrosive toward the heating elements. Our heating elements are made of FrCrAl and some more information on this material can be found in https://doi.org/10.1021/acs.chemrev.0c00149.
How large is the diameter of the heating element and how it is the heating element centered in the flow channel ?
A: We cannot give a precise answer to this question. The only thing we can say is that the heating element occupy a significant portion of the flow channel. Additionally, the size of the gap between the heating element and the catalyst has been optimized.

What is the cost of produced H2 from e SMR technology for reference case?
A: There is not a clear answer, the cost significantly depends on natural gas and electricity prices that depend on regions and time.

What is the inlet flow rate of EReTech's Pilot-1?
A: 100 Nm^3/h of biogas

e-Coduct

What is the required feed H2S concentration for this technology to be effective?
A: In principle ~30-50% is the best for us. If it is more concentrated we could blend it with CO2 (e.g. green CO2 after CHP from a biogas plant, if available in proximity). If less, process efficiency would be impacted as CO2 will stay as an inert diluent.

What is the system diameter?

A: 1200°C, intern diameter 12cm, standard material available on the market. Active zone: approx. half a meter

Comment from Patrice Perreault: We are also acquiring a pre-pilot electrothermal fluidized bed at the University of Antwerp/Blue App for methane pyrolysis, with similar dimensions as the ones mentioned.

eQATOR

Do you believe the integration of microwave technology in your design is scalable?
A: We certainly hope the microwave technology is scalable, but it is still too early to comment on that.

If this technology can be retrofitted to existing SMR/ATR assets, when reached TRL 9?
A: One should be in principle retrofit the resistive heating technology to any reforming technology, as long as it is possible to successfully washcoat the required catalyst on the electrically-conductive honeycomb. We will be looking at other reforming chemistries later in the project.

Can you tell more about the ceramic materials used in the electrically heated honeycomb substrates for the eQATOR project?
A: I do not have permission from the consortium to discuss the ceramics in the resistively heated honeycombs.

Scalability of the microwave heating system: it is not possible to discuss it for now.

TITAN

What is the quality of carbon product compared to plasma technics?
A: there are process of plasma straight to methane, technologies implying catalysts. Methane decomposed in carbon, black carbon; the quality of the carbon depends on the plasma, with or without the catalyst.

How Syngas ratio and carbon black production impact will be when only using methane?
A: The cracking of methane does not produce CO, but only H2 and solic carbon

How Capex of catalytic fluidized bed catalytic reactor compares with plasma reactor for methane pyrolysis?
A: For TITAN, CAPEX and OPEX estimation can be only carried out at demonstration scale (TRL-5). It is too early to say.

STORMING

Effective treatment of Reactor outlet is important. How separation of carbon black can be done effectively from quenching step as particle size is very small, that can be an issue?
A: The challenging aim is to regenerate the catalyst and harvest the CNTs within the reactor. We are working in some chemical scissors treatments to achieve this aim.

You showed the heating of fluidized bed by microwaves. And also you show a SiC honeycomb. Does this mean, that you have the fluidized bed in the holes of honeycomb?

A: We'll have structured materials in the fluidized bed but I cannot tell much more about the configuration of the reactor at this stage. The picture in the presentation is for a fixed bed reactor, not a fluidized bed.

Goal of H_2 productivity higher than 5-6L/ g catalyst per hour; depends on the preparation of the CNT.
The hydrogen will be separated in a PSA and the off gas will be circulated; we are also doing the system modeling, but the results are too depending on the reactor conditions, conversion and selectivity to publish at this time.

Electrification technology

In page 5, you consider production of H2 by electrolysis. Why TotalEnergies doesn't consider production of H2 by methane pyrolysis? It is surprising given the benefit on emissions reduction and electricity consumption per kg H2.
A: It is not at a scale yet and the market for carbon by-product is questionable.