

Self-powered CO₂ converter

5th HVM New Materials 2019, 6-7 November Cambridge, UK

www.cir-strategy.com/events

Who we are

Founded in 2002, Omnagen has been working on the sustainable use of hydrocarbons.

Omnagen is using fuel cells to develop low cost chemical processes using self-sustaining reactions.

The reactions generate electricity – this is **clean carbon energy**.

The most recent development is a device to convert carbon dioxide, natural gas and air to syngas. The syngas can be converted into a wide range of chemicals and polymers by existing chemical processes.

Omnagen owns a range of granted patents, and patent applications.



The problem:-

Current emission levels

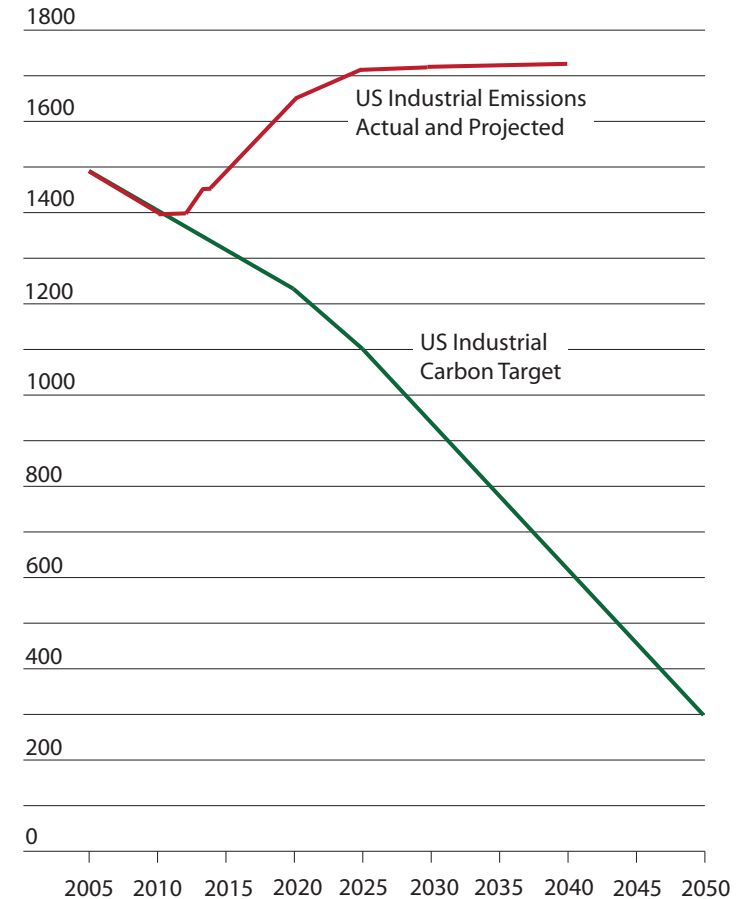
Social responsibility

Regulations

Reduce, Reuse, Recycle

US Industrial CO₂ Emissions vs Target

Million tonnes CO₂ equivalent per annum



Sources: US EPA; US EIA; whitehouse.gov

Converting CO₂ : CO₂ is thermodynamically stable.

Carbonates are more stable.

Intermittent renewable energy.

Energy from other molecules.

What Omnagen can offer:

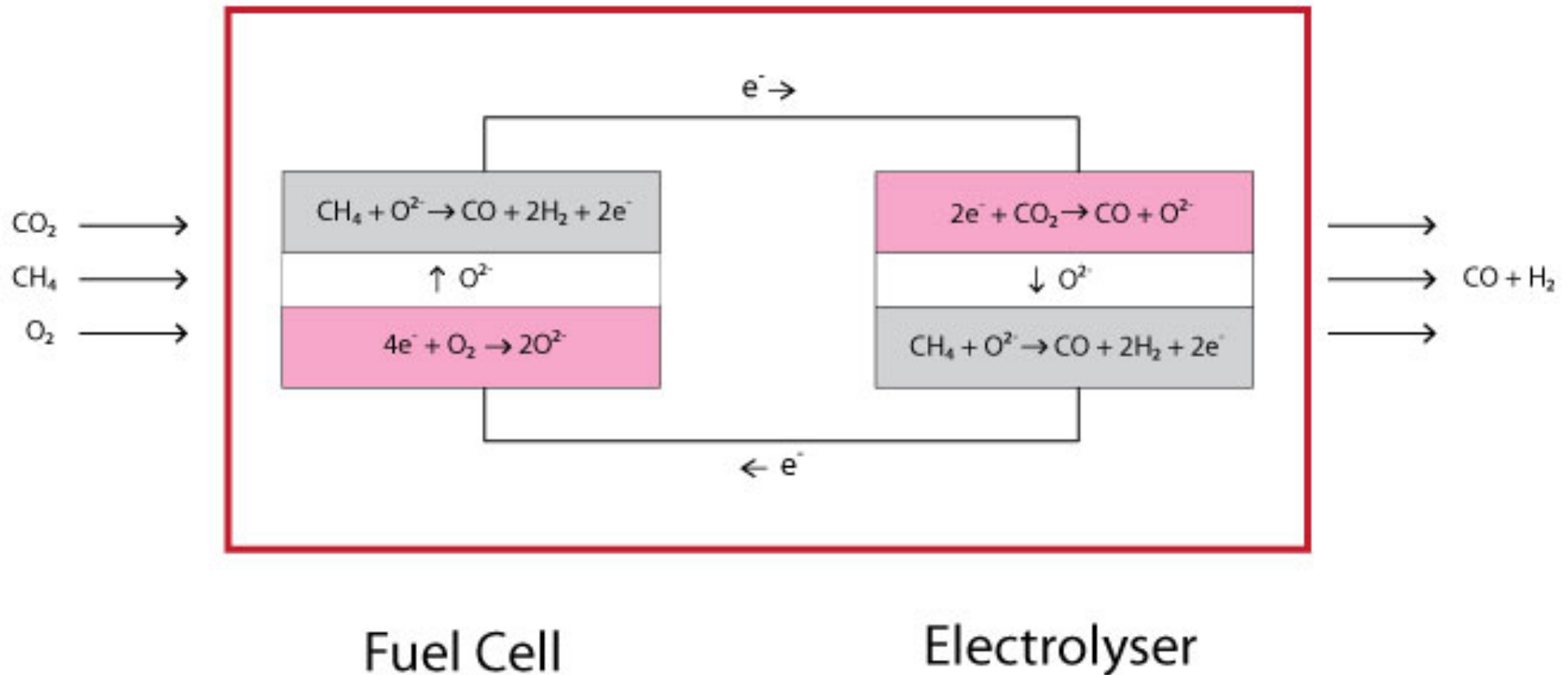
A self-powered CO₂ converter.

Requires no external heat or electricity input.

Very scalable.

Converts the CO₂ to syngas.

Principle of the CO₂ converter:

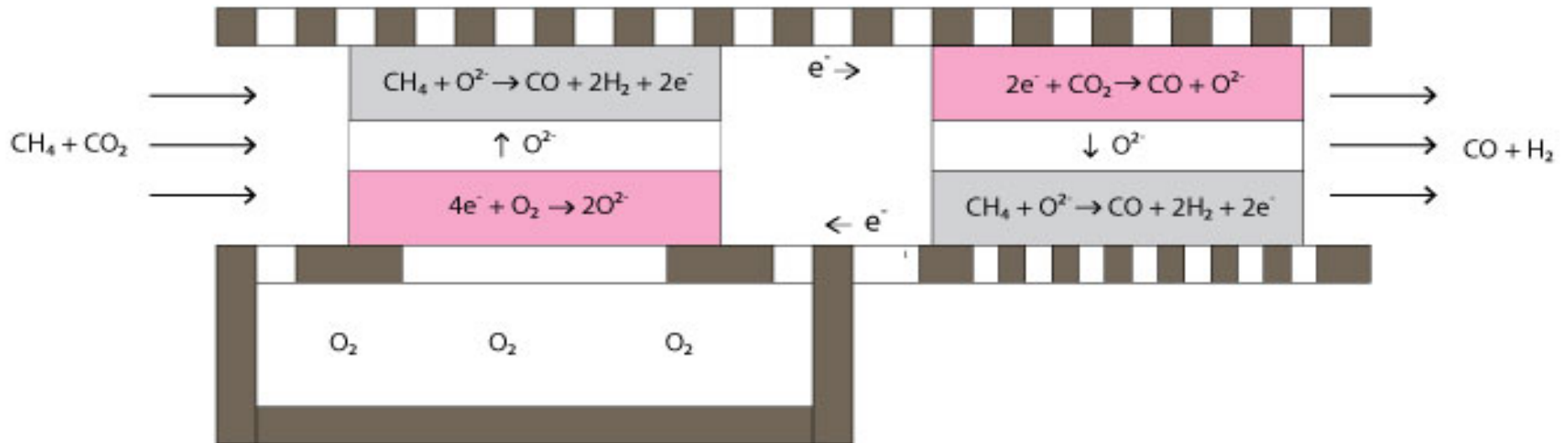


Isolated – no heat or electricity required

The SPOCC Reactor:

Fuel Cell

Electrolyser



The 3 reactions :

1. Fuel cell:- $2\text{CH}_4 + \text{O}_2 = 2\text{CO} + 4\text{H}_2 + \text{electricity} + \text{some heat}$

2. Electrolyser:- $\text{electricity} + \text{heat} + \text{CH}_4 + \text{CO}_2 = 2\text{CO} + 2\text{H}_2$

3. Direct:- $2\text{CH}_4 + \text{O}_2 = 2\text{CO} + 4\text{H}_2 + \text{heat}$

Main applications:

1. Biogas – AD produces a mixture of CO₂ and CH₄.
2. Natural gas extraction – CO₂ in the gas, gas-to-liquid, stranded assets.
3. SMR and olefin production – converting the waste CO₂.
4. Natural gas power stations.
5. Cement production.

Summary

Use of technology to reuse carbon dioxide rather than bury it.

The technology requires no energy input.

Allows the sustainable use of hydrocarbons. Carbon is only a problem if it ends up in the atmosphere.

Doing what's right, in the right way, for the planet.

What Omnagen is looking for:

Collaboration with industry and research institutions with an interest in the target markets, and particularly those with expertise in ceramic processing, chemical engineering, and gas processing.

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Omnagen

Innovation with integrity