

20 years expertise in Plasma technology

Gas reactors engineering
for clean H₂ and E-fuels production



ABOUT MATERIA NOVA

Materia Nova is recognized as a technological accelerator of sustainable innovations in the field of new materials and processes.

The R&D center offers five different services:

- Materials and Processes conception and innovation
- Equipment Design and Process Upscaling
- Analysis and Characterization
- Life Cycle Thinking
- Project Development and Management

The approach of Materia Nova is based on an open and collaborative innovation.

From the understanding of the problems and requirements of our customers, we jointly select the best scientific and technical solutions which are then tested on a pilot-scale before industrialization. The development and the service provided are always unique and customized and give effective solutions as well as a major competitive advantage to our customers.

OUR TECHNOLOGIES AND SOLUTIONS

Our expertise in **surface coatings and treatments**, in **polymers and composites** and in **biotechnology** is fertile ground for:

- developing new functional performances of materials,
- taking up the energy and environmental challenges of our society,
- protecting and promoting the health sector.

OUR STRENGTHS

- A multidisciplinary team of experts
- A wide range of cutting-edge equipment
- An open and collaborative innovation strategy at national and international level
- Innovative projects for and with industrial companies
- Collaborations with R&D centers and universities worldwide
- A strong network of companies, spin offs and start-ups (B-SENS, ESIX and IONICS)

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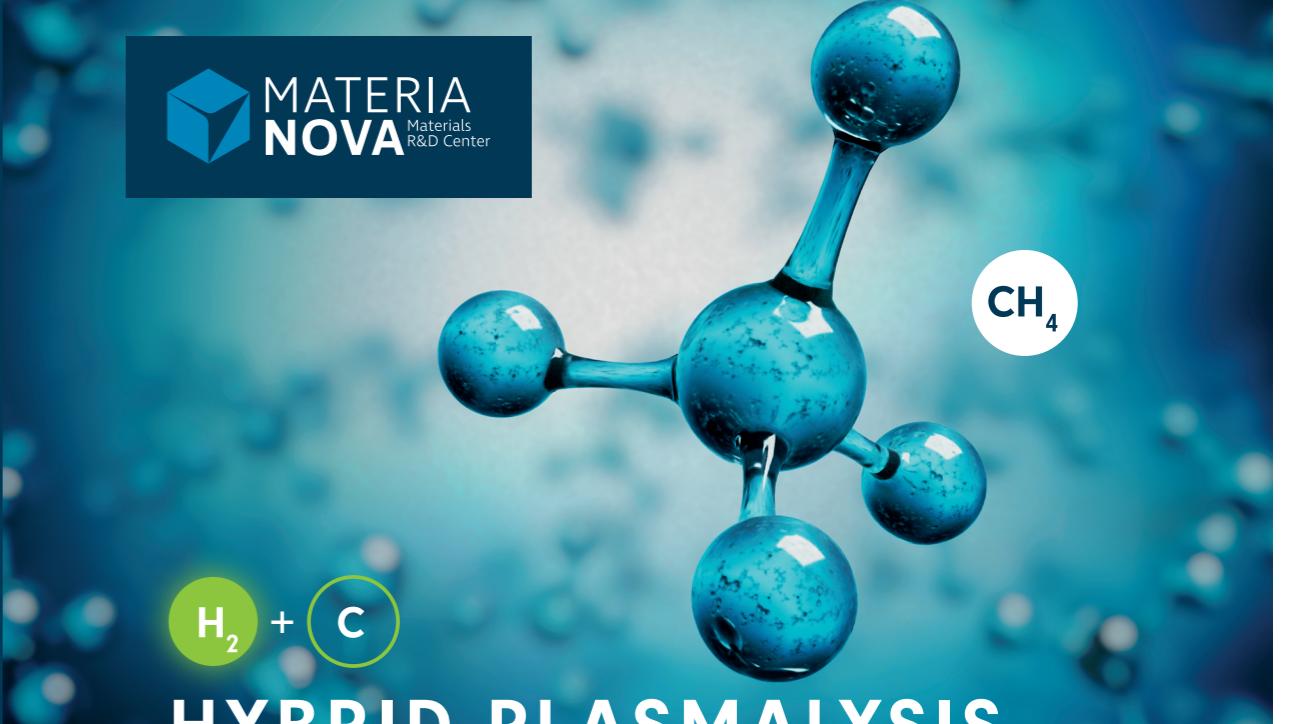
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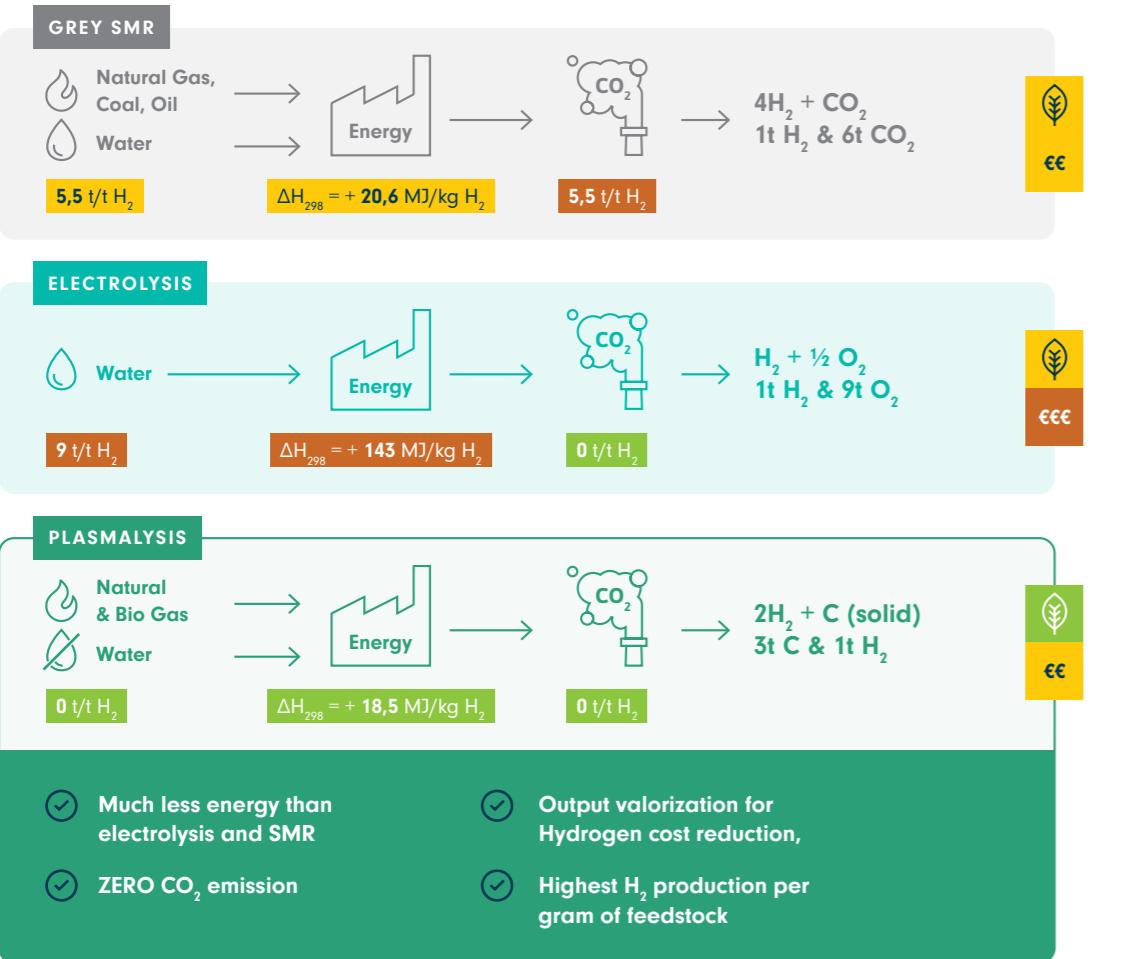
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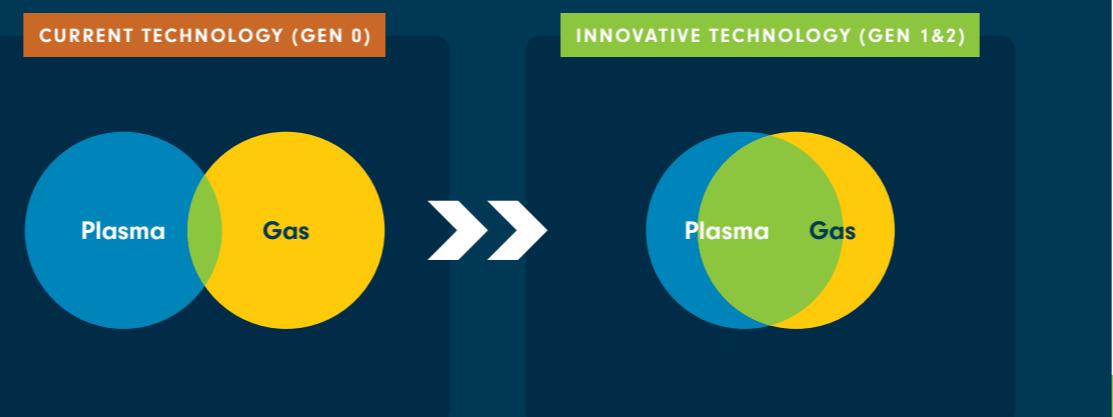
The innovative breakthrough of hybrid plasmalysis



Hydrogen production by hybrid plasmalysis: An innovative alternative technology to SMR and Electrolysis



The innovative breakthrough of hybrid plasmalysis



Current plasma Kvaerner technology:

- » Low conversion efficiency ($\pm 50\%$)
- » Large reactor core (furnace)
- » High radiative losses and non-optimal energy efficiency
- » Expensive materials used to operate at very high temperatures
- » Limited lifetime (electrodes erosion, high temperature insulated furnace) and maintenance

New Materia Nova technology:

- » Improved overall energy and conversion efficiencies vs. SoA ($\pm 80\%$) by an original reactor geometry maximizing the interaction between the plasma and the gas
- » Selective production on demand: turquoise/green H₂ with solid carbons (carbon black, graphitic) or hydrocarbons **without CO₂ emission**
- » Lower cost materials/components for maximized industrial productivity and lower maintenance costs

Gaz valorization by hybrid plasmalysis for decarbonized hydrogen production

