ON THE FLEXIBILITY OF SYNGAS PRODUCTION THROUGH CATALYTIC PARTIAL OXIDATION

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The utilization of NX CPO™, based on Short Contact Time-Catalytic Partial Oxidation technology, for syngas production presents a versatile approach to address various industrial needs.

Main advantageous characteristics of this technology are summarized as follows: i) small reactors (ca. 1/100 volume of BAT technologies), ii) wide flexibility with respect to the composition of the reactants (including feedstock with a bio-mass origin) and production capacity, iii) low CO_2 emissions due to the possibility of avoiding heating furnaces, iv) possibility of modular pre-built and skid mounted units to be transported and hook-up at utilization sites with a drastic reduction of the on-site activities.

Three applications will be discussed, showing peculiarities and advantages: hydrogen production, booster in Sustainable Aviation Fuel (SAF) production, and application in hard-to-abate sectors.

NX CPO™ provides an efficient method to produce high-purity hydrogen from natural gas. Produced syngas leaves the NX CPO™ reactor at temperature around 1000°C and proceeds to the upgrading section consisting in multiple heat recovers, a water gas shift section and hydrogen purification units. Pre-combustion carbon capture is used to reduce the carbon footprint associated with the utilization of fossil fuel.

In the context of SAF production, NX CPO™ offers a pathway to recover the Fischer-Tropsch off-gases, producing additional syngas. In this way, utilization of external green hydrogen, typically produced via electrolyzer, is reduced, with a considerable saving in the overall SAF cost.

In hard-to-abate sectors, such as the steel industry, NX CPO™ can be employed to reduce iron ores in blast furnaces for steel production. By utilizing syngas as a reducing agent, this process can significantly lower CO_2 emissions compared to traditional methods, aligning with global decarbonization goals.

Overall, the flexibility and efficiency of NX CPO™ technology make it a promising solution for enhancing syngas production and its applications across multiple sectors.