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Process Analytics for Hydrogen Liquefier

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Abstract:
Hydrogen will play a key role in the decarbonization of the industry, energy, and mobility sector. Green and blue hydrogen will increase in coming years, but also hydrogen coming as an excess or by-product from industries such as Chlorine plants, Refineries, Ethylene plants etc. To be used for application such as mobility in fuel cell or in the semi-conductor industry, Hydrogen must be purified, liquefied and finally stored before transportation. Most popular purification process is known as PSA (Pressure Swing Adsorption). Hydrogen only liquefies at very low temperatures (below –253°C). Liquefaction process is typically based on Claude and Brayton Cycle and done by several cycles of compression and heat exchange with helium. Hydrogen can be finally stored and distributed. The proposed paper will review some innovative gas analysis techniques used to operate the purification and liquefaction processes but as well to monitor the Hydrogen quality. For example, some impurities must be monitored as they could generate some issues in the liquefaction process but as well in the final product for the use of hydrogen in fuel cell. Techniques include online gas chromatography, thermal conductivity, and tunable diode laser spectroscopy.
Presentation layout:

- Introduction
- Hydrogen Purification and Liquefaction Processes
- PSA Application
- Ortho-Para conversion Application
- Hydrogen Impurities Measurement Applications