GAS ANALYSIS CAPABILITIES

Overview

When using hydrogen as an energy carrier it is essential to be able to determine the quality of the H_2 supplied. Hydrogen can be produced from various sources, for example, water, NH_3, biogas etc. Each of these hydrogen sources may result in impurities in the product stream such as O_2, N_2, CO_2, etc.

General gas chromatography

HySA Infrastructure has the ability to quantify hydrogen from 10 % up to 99.999 % produced from various gas sources. Both online H_2 analysers and sophisticated SRI8610C and Bruker 456 GCs are used. The SRI and Bruker GCs are equipped with separating columns such as Molecular Sieve and Hayesep D, and in combination with TCD, HID and FID detectors, allows the detection of various gas compounds such as He, Ar, N_2, CH_4, CO, NH_3 and CO_2.

Flue gas and multicomponent trace analysis

HySA Infrastructure has the capability with a multi-gas analyser (Environnement S.A MIR9000) to quantify trace gases such as CO, CO_2, NO, NO_2, O_2 and total hydrocarbons in the ppm range. This equipment is essential to determine flue gas quality from combustion processes or trace compounds in gas streams related to hydrogen production from various sources. The analyser measures O_2 with the paramagnetic principle, the NO_x with the chemiluminenscence principle and the CO and CO_2 with infrared and a gas filter correlation technique.

Oxygen impurity measurements

Oxygen (O_2) is an important gas to analyse when considering hydrogen production from water electrolysis, as O_2 is produced at the anode of the electrolysis process and is considered a contaminant in the hydrogen stream (present due to O_2 diffusion). Oxygen quantification capabilities at HySA Infrastructure include an on-line O_2 analyser for the % level while the sophisticated SRI and Bruker GCs are capable to detect O_2 down to ppm levels.

Hydrogen purification from CO_2

Hydrogen purification from CO_2 is also important in the mining industry. HySA Infrastructure can use PEM electrochemical separation while an accurate on-line analyser (ABB, EL3020) is used to evaluate the product purity based on the difference in thermal conductivities of CO_2 and H_2.