SHIMADZU
Excellence in Science

Hydrogen/Carbon Dioxide Monitoring System

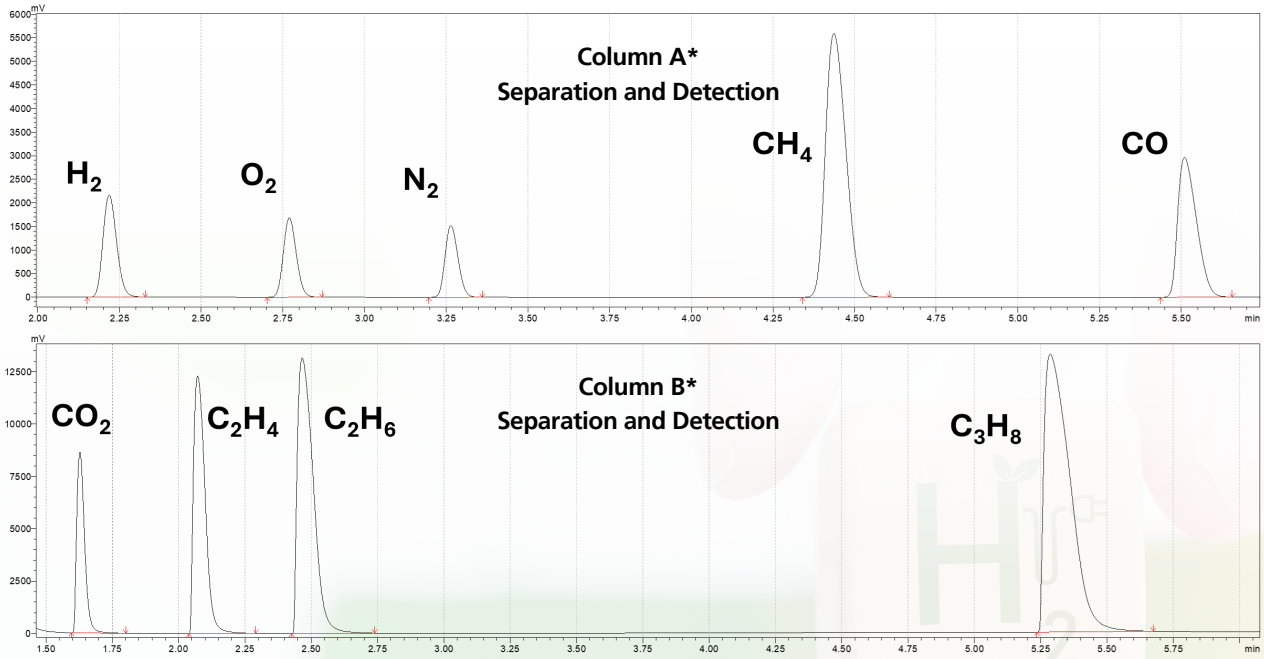
Introduction

Advancements in H_2 production, carbon capture and CO_2 recycling techniques require robust measurement and analysis.

Electrocatalysis, photocatalysis and other methods produce key products including H_2, O_2, N_2, CH_4, CO, CO_2, and valuable hydrocarbons.

Shimadzu provides a Gas Chromatography system that facilitates easy qualitative and quantitative analysis of these major components.

Nexis GC-2030 with 2 detectors & top-mounted valves



*The chromatograms shown are based on example data. *Other configurations can affect results.*

System Overview

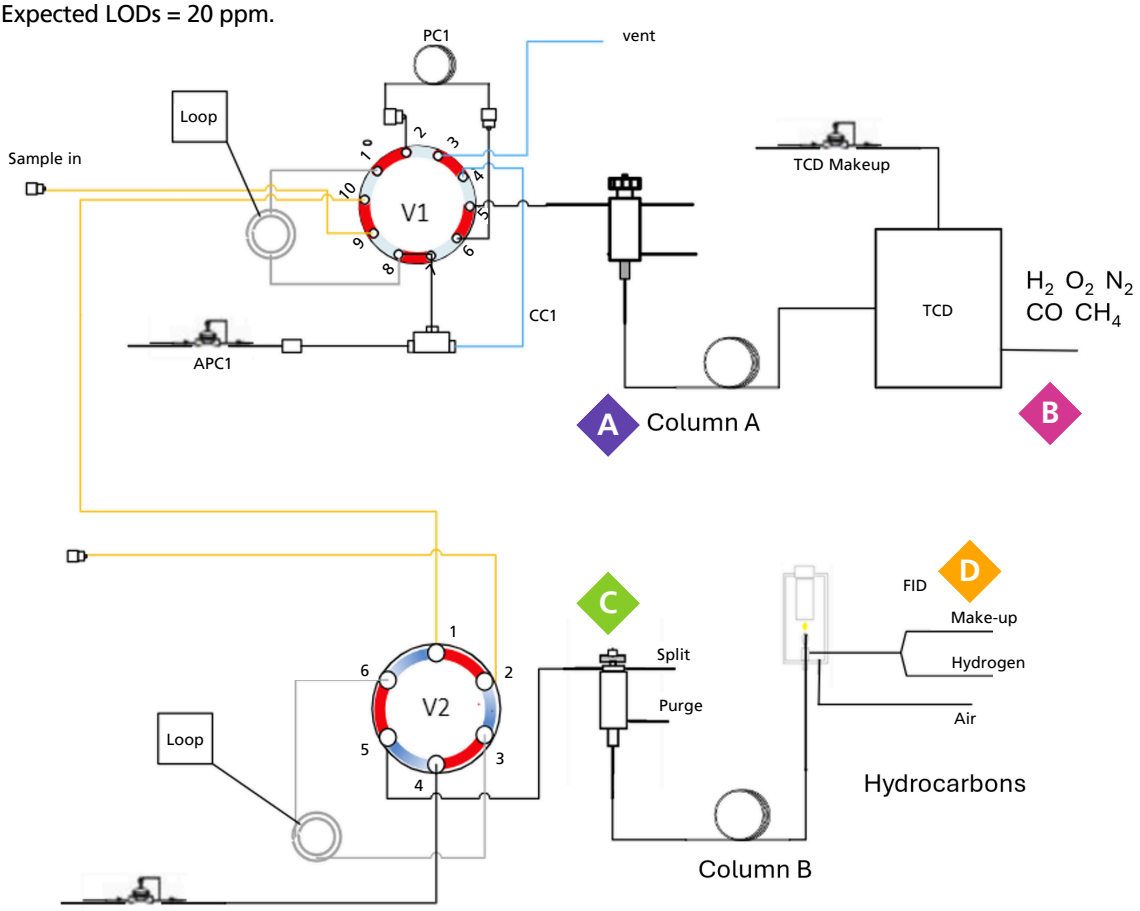
Shimadzu's flagship GC-2030 configured for H_2/CO_2 Reactor Monitoring offers:

- Bespoke build
- Sample run-time less than 10 minutes
- Fully developed analytical method
- Flexible and future-proof options with upgrade pathways available
- SPL injection port, FID detector for valuable light hydrocarbons C_2-C_5
- TCD detector and 10-port valve for permanent gas analysis
- Installation by factory-trained Shimadzu Engineer
- On-site bespoke training by Shimadzu Application Specialist
- Ongoing technical support online for the instrument's lifetime
- Windows 10/11 PC with intuitive LabSolutions Software package

System Schematic

Using a 10-port valve (V1) with backflush capability, using Column A with TCD detection for the analysis of permanent gases including H_2, O_2, N_2, CH_4 CO and CO_2. Expected LODs = 100 ppm (lower achievable, dependent on carrier gas used).

A 6-port valve (V2) injects onto Column B with FID detection for the analysis of light hydrocarbons (chain length C_2 to C_5). Expected LODs = 20 ppm.



Flexible Options and Future-Proofing

A Column options depending on analytical requirements

Column A choice: Molseive 5A for baseline separation of all permanent gases, or Carboxen 1010 to facilitate separation of H_2, O_2, CO, CH_4 and CO_2 on the TCD.

B High-sensitivity analysis with BID

Use BID (Barrier Ionisation Discharge) detector to improve LODs of H_2, O_2, N_2, CH_4 CO and CO_2 by replacing the TCD.

C Liquid Sample analysis (valuable alcohols and hydrocarbons)

Column B switched out for hydrocarbon capillary column for analysis of liquid samples.

D CO_2 detection using methanizing technology

Replace the FID nozzle with Shimadzu's Jetanizer™ to facilitate CO_2 detection on FID.

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