IGASORP DELIVERS FOR FUEL CELLS

Why DVS is Essential for Fuel Cells

Dynamic Vapor Sorption (DVS) quantifies how fuel cell membranes and other membrane electrode assembly (MEA) components absorb, retain and transport moisture; all critical factors affecting performance. By replicating operational humidity conditions, DVS reveals how **ionomer membranes, Gas Diffusion Layers (GDLs), and catalyst layers** respond to hydration. This exposes behaviors that influence efficiency, durability, and water-management balance.







Critical Use Cases

- **Membrane hydration & conductivity:** determine optimal water content for conductivity without GDL flooding
- **Diffusion & kinetics:** evaluate water transport within membrane layer
- **Catalyst layer characterization:** understand porous structure and water retention of catalysts and supports
- **Durability testing:** cyclic hydration and dehydration to assess mechanical stress, swelling and degradation



IGAsorp: Rethink DVS. Unlock Better Outcomes

Key IGAsorp Features

ENVIRONMENTAL CONDITIONS

- Wide temperature and humidity range (up to 85 °C and 98 %RH)
- Perform measurements up to 300 °C for testing of high-temperature PEMFCs
- Extended tests with automated water refilling

SENSITIVITY & STABILITY

- Detect subtle hydration changes in thin membranes and catalyst-coated samples

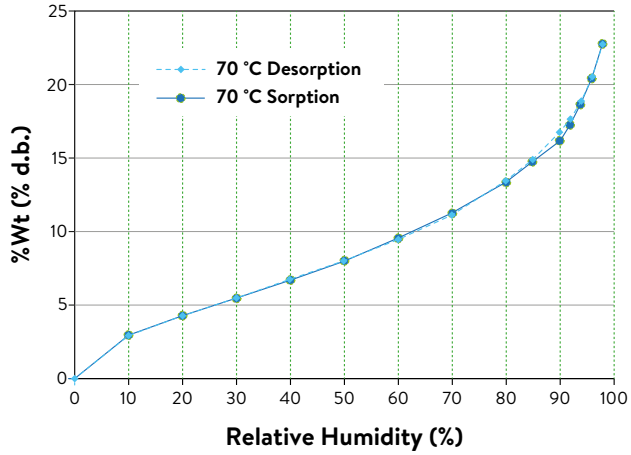
VERSATILITY

- Test powders and membrane samples
- Dedicated permeation membrane cell

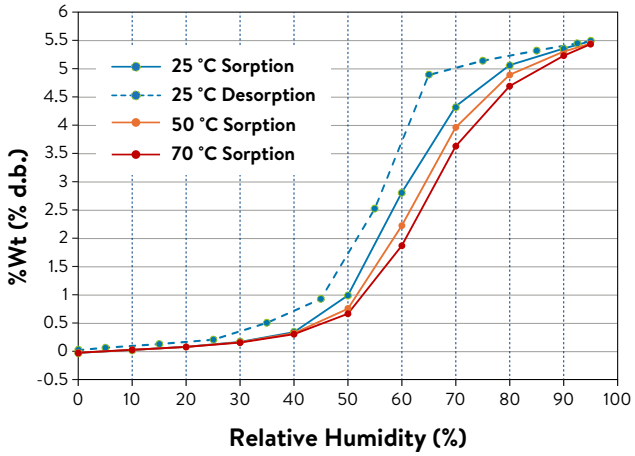
IGAsorp delivers precise hydration insight to power more efficient, durable fuel-cell membranes



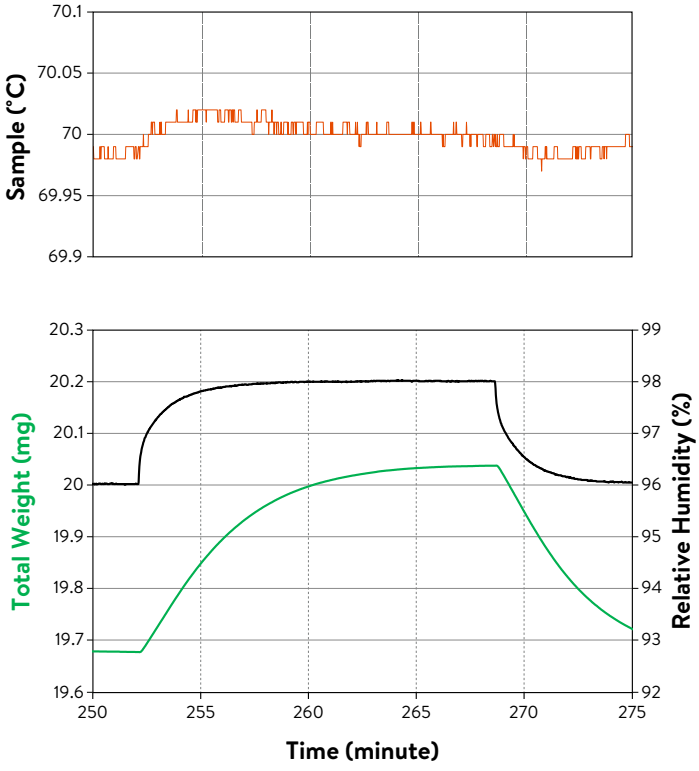
EXAMPLE DATA

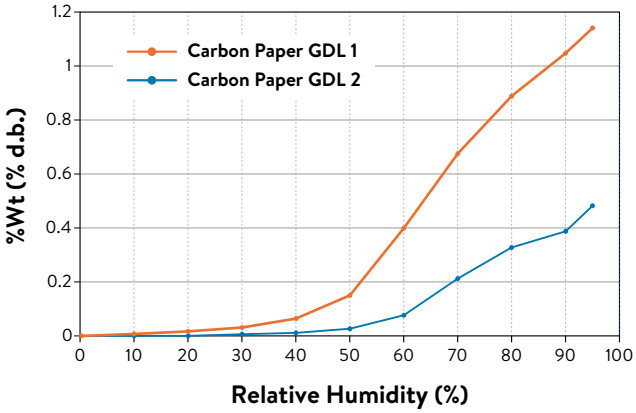


Water sorption and desorption isotherms for a commercial Nafion ionomer membrane at 70 °C.



Temperature dependence of water sorption for Vulcan XC72 carbon support. Sorption isotherms at 25, 50 and 70 °C are presented, as well as a desorption isotherm at 25 °C.





Water sorption isotherms for two commercial Gas Diffusion Layers (GDLs) at 70 °C

Left: Precise high-temperature, high-humidity kinetics (70 °C, 94 to 98 %RH) for a commercial Nafion ionomer membrane. Temperature stability is shown at the top.

High-temperature, high-humidity control for PEM fuel-cell materials

IGAsorp uniquely enables precise sorption and kinetics measurements at **operation-relevant temperatures (60–80 °C) and very high humidities (>90 %RH).** These conditions are essential for MEA component characterization, especially for understanding catalyst-layer flooding and near-saturation water behavior.

With **IGAsorp**, researchers can probe high-temperature, high-RH regimes effortlessly and with exceptional stability - a capability beyond the practical limits of other DVS systems.

For more information please contact our Sales and Application team via **info@hidenisochema.com**

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