

www.huttonltd.com info@huttonltd.com

Analytical Services for Oil & Gas

The James Hutton Institute is a respected, globally recognised research organisation. Scientists at the James Hutton Institute follow the inspiration of James Hutton, whose observations on Scotland's rock, soils, agriculture and landscapes forever changed the way we think about the world.

Analytical scientists at the James Hutton Institute have a long track record of working with the oil and gas sector. As the Institute's commercial subsidiary, James Hutton Limited is a leading provider of chemical and geological analysis to the biggest names in the industry.



James Hutton Limited is the commercial subsidiary of the James Hutton Institute, Scotland.

JAMES HUTTON INSTITUTE

LABORATORIES

An established team of world-renowned scientists, based in laboratories at the James Hutton Institute's Aberdeen site, provide expert analysis and interpretation of results to deliver powerful solutions. James Hutton Limited analytical techniques aid geoscientists, chemists and operators in the oil and gas sectors to enable decision making.

A small, close knit team means that techniques are often combined to find the most accurate results for clients and there are extensive material libraries and experiences to draw from.

METHOD DEVELOPMENT for nonroutine analysis

People are what set us apart from other analytical laboratories. Lab teams at the James Hutton Institute will work with you to develop methods for nonroutine analysis. Rapid method development for newly required applications is a speciality, achieved through:

- Literature surveys accessed through the resources of the James Hutton Institute
- Extensive experience of sample preparation techniques

The expert chemists that carry out analyses for James Hutton Limited are dedicated experts in their own techniques with many years of experience, which provides a more detailed understanding and interpretation of results than a high throughput laboratory.

UKAS

ACCREDITATION

The James Hutton Institute analytical laboratories operate to the standards required by UKAS accreditation and many of our routine techniques are accredited. A full accreditation schedule can be found at www.UKAS.com. Search for testing Lab 7541. Our ability to perform a huge variety of techniques means that a one-off analysis may not be accredited, but our total commitment to high standards ensures it will be carried out to the exacting specifications that accreditation requires.







FOURIER TRANSFORM INFRARED SPECTROSCOPY (FTIRs) for the Characterisation of Samples

FTIR Spectroscopy is an extremely versatile analytical technique which can provide a chemical fingerprint for a diverse range of both organic and inorganic samples.

FTIR Spectroscopy can identify, characterise and qualify a large variety of samples from biological to clay minerals. It excels at tackling 'problem samples', identifying unknowns or confirming identification based on a reference material.

Applications to the oil and gas industry include identifying scale deposits, corrosion products, produced water solids, brines, drilling fluids, clay minerals and pipeline blockages e.g. sludges and naphthenates.







X-RAY POWDER DIFFRACTION (XRPD) for Mineral Analysis

The XRPD technique is used to quantify the proportions of different mineral, or other substances, when they are present in a mixture. Some types of clay minerals can only be identified precisely by techniques such as XRPD.

Professor Steve Hillier and his team at the James Hutton Institute are specialists in the analysis, identification and quantification of clay minerals by XRPD.

Typical applications of XRPD include:

- Quantification of clay minerals and non-clay minerals in core and cuttings samples
- Identification of corrosion products and scales
- Assaying of industrial minerals and cements
- Measurement of smectite content in bentonite
- Lower Limit of Detection (LLD) of forms of crystalline silica and potentially asbestiform phases

Find out more at www.claysandminerals.com

SCANNING ELECTRON MICROSCOPY (SEM) for Mineralogy and Corrosion Products

Electron Microscopy is an extremely versatile tool which can be used in the oil and gas industry for the study of both morphology and material composition.

Applications to the oil and gas industry include

- **Scale analysis:** giving a detailed study of layers structure and elemental composition
- **Corrosion studies:** giving a detailed analysis of corroded areas through imaging and elemental analysis
- X-ray mapping: for failing components, providing detailed elemental maps
- Geological evaluation: for sandstones, carbonates and shales, providing a detailed description of minerals

Advanced Particle Classification (APC-SEM): can evaluate the scaling risk from produced water by surveillance and monitoring of suspended solids.

Energy Dispersive Spectroscopy (EDS): for the mineral, textural and reservoir properties of a formation. Optical microscopy of thin sections may be added to complement the evaluation.

Dry SEM: for the visualisation of solid-related formation damage mechanisms

Cryogenic SEM: for an in-situ visualisation of fluid distribution and fluid-related formation damage mechanisms or for visualisation of emulsions in supplied chemicals.

GAS CHROMATOGRAPHY (GC)

Gas Chromatography – **Mass Spectrometry (GC-MS)** is a powerful technique for identifying and quantifying a wide range of volatile and semi volatile organic compounds in a variety of matrices.

Gas Chromatography – Flame Ionisation Detector (GC-FID) can be used for Total Petroleum Hydrocarbon and impurity checks.



STABLE ISOTOPE ANALYSIS for Reservoir Geology and Pollution Studies

Isotope analysis of geological materials including mineral separates, drill cuttings, whole rocks, residual salts, formation waters and micro-fossils, can be applied to reservoir geology nationally and internationally.

In 2017 the James Hutton Institute invested in an Isotopx Phoenix TIMS, which will measure isotopes with the highest sensitivity and ratio precision. Combined with a new prepFAST automated ion-exchange column system, this enhances our ability to produce high quality, high precision data for our clients.

For the oil and gas industry, we work in partnership with ISOTOPIC Ltd. delivering high precision radiogenic isotope analysis. Visit www.isotopic.co.uk further information.

QUANTIFICATION OF ORGANIC AND INORGANIC COMPOUNDS for specific process needs

This could be used for processed water analysis, such as 12 ion monitoring for scaling issues, identifying environment impairing compounds, such as sediment piles for heavy metals, or organic contaminants from industrial processes (e.g. PAHs, PCBs, PBDEs, POPs, EDCs) for compliance with environmental regulations.





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