

PLUG TO PORE SCALE ANALYSIS

In shale, we believe you must understand your pore system to understand the behavior of your reservoir. Ingrain's multi-scale services help our clients to find and develop their most productive rocks by providing critical insights into:

- Whether and how the pores are connected
- Where the hydrocarbons are and where the water may be
- The organic matter/porosity threshold
- Framework mineralogy

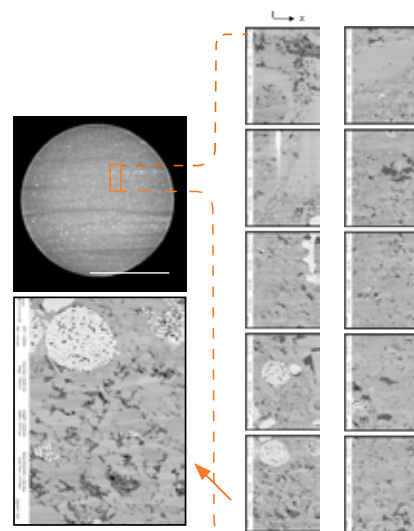
ZoneID™

Identify target zones with ZoneID™- Plug to pore scale evaluation targeted to quickly identify shale rock characteristics from micro-CT, SEM, and mineralogical analysis.

Our ZoneID™ service utilizes both CT and quantitative SEM technologies. This unique offering provides values of porosity and organic matter volume fraction and is also used as a screening tool to ensure selection of representative samples for the subsequent PoreHD™ FIB-SEM analysis. Multiple 2D SEM images are used to obtain porosity and organic matter volume fraction for each ion-milled sample. Both secondary electron (SE) and energy-selective backscatter (ESB) images will be provided for each sample. SE images give maximum resolution of the porosity and ESB images help discriminate between different solid components (minerals and organic matter).

DELIVERABLES

- MicroCT Projection Images
- Secondary Electron Images
- Backscatter Images
- Pore Volume Fraction
- Organic Matter Volume Fraction
- High Density Volume Fraction
- Pore Volume Fraction Associated with Organic Matter
- Data Plots
- Bulk Density
- Volume Fractions of Selected Elements



PoreHD™

Three-dimensional computation of permeability, porosity, and organic material from computations on FIB-SEM rock volume.

PoreHD™ analysis begins with nanometer-scale FIB-SEM pore and matrix imaging in 3D. This is followed by segmentation, image processing, and creation of digital rock volume. All deliverable rock properties are derived from analysis and calculations are based on the same digital rock volume, ensuring internal consistency of delivered data.

DELIVERABLES

- 3D movies
- Absolute Permeability – horizontal and vertical
- Porosity – total, connected, and isolated
- Porosity Associated with Organic Matter

