

MetaSystems Application Paper

High-throughput digitization of Petrographic specimens

Digital microscopic imaging has changed the way the findings of petrographic examinations are nowadays carried out, documented and presented. Moreover, the automation of such studies offers huge improvements in productivity and potentially significant reductions in the unit costs of examinations.

Automated high-throughput digitization of geomaterials using several microscopic techniques, which are routine in this field, currently represents a substantial step forward in this sense.

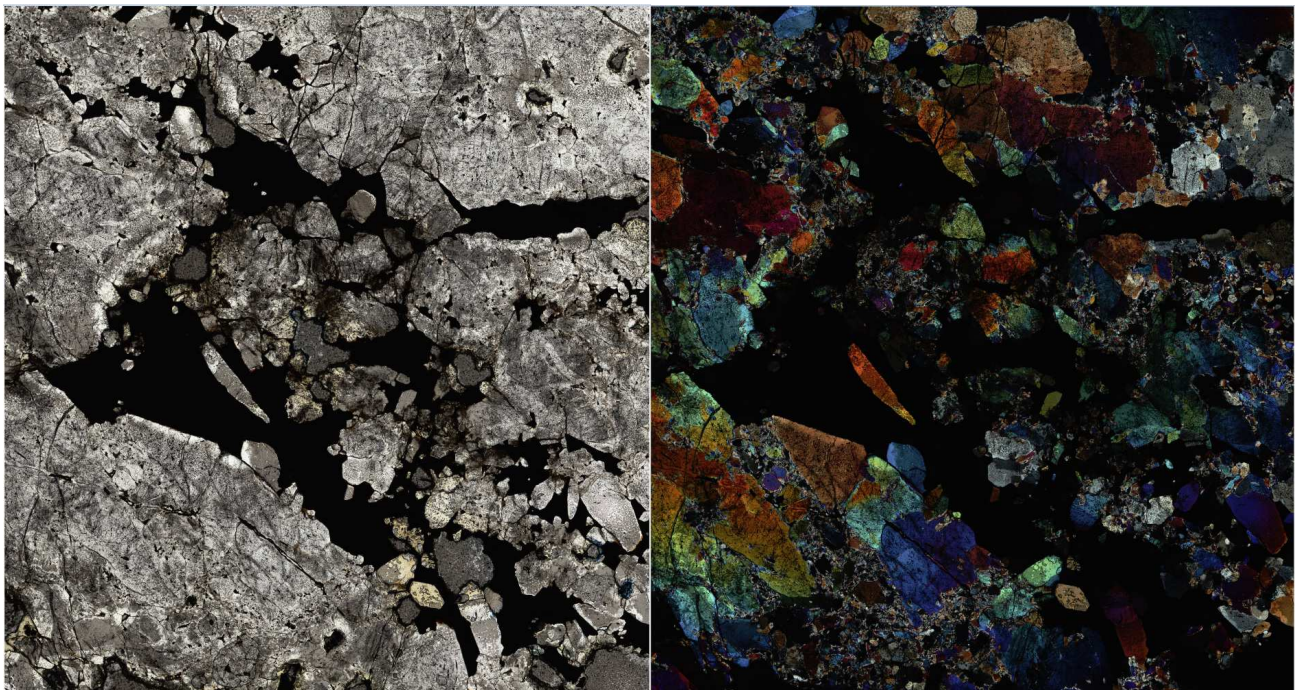


Fig. 1 - Plane Polarized Light vs. Crossed Polarized Light – at 10x

Relying on 35 years expertise in the development of automated solutions for microscopy and image analysis, MetaSystems has now developed the most comprehensive imaging system for unattended scanning of geological samples.

Metafer, MetaSystems' slide scanning platform, offers a unique combination of selected scanning hardware and outstanding imaging software. It constitutes an extremely versatile and robust system for microscopy automation.

User requirements differ considerably within the wide scope of geosciences. Whether translucent thin rock sections for being observed with plane and/or crossed polarized transmitted light, opaque metal specimens mounted on blocks and polished for reflected light, or coal samples for epi-fluorescence. **Metafer** is the first scanning platform for sample digitization that 'meet the needs' in this field, all-in-one.



Fig. 2 – **Metafer** scanning platform for petrography

Following arrival in the laboratory, geomaterial samples are first examined in the original condition using unaided eye. Then, simple physical and chemical tests may be performed on the specimen to assess relative hardness or to determine if carbonate minerals are present. Thereafter, the sample may be examined using a low-power stereomicroscope. This visualization helps to determine the most appropriate location for thin section specimens and polished specimens to be taken for further, more detailed high-resolution microscopic examination.

Manual microscopic analysis and documentation of petrographic samples is an arduous and time consuming process, which requires hours of man power for a set of specimens. The automation of this task relieves analysts from this work so that they can rather review the results, increasing lab productivity.

Sample digitization is easy with **Metafer**. The system scans unattended batches of up to 800 samples in one run, by means of our scalable feeder (SFx80). Furthermore, scanning parameters as magnification, observation techniques or focus stacks, are arranged in user-definable parameter sets.

Features Overview

As fully configurable Platform, **Metafer** always meets your needs.

Due to its modularity, it is able to suit highly different requirements : different lab environments may address different purposes.

Below, a brief summary regarding Metafer's versatility is provided:

-Microscopic observation techniques :

- Plane-polarized light
- Crossed-polarized light with several rotation angles
- Both in transmitted- and reflected-light conditions
- Epi-fluorescence
- ... additionally, Brightfield, DIC-Nomarski and Phase contrast are also available.

-Charge Capacity : from 5 to 800 samples

-Sample types : suitable for both standard thin-section slides and polished blocks for opaque materials.

-Magnification (range) : from 1,25x to 100x

-Fully automated and flexible sample digitization.

-Furthermore, Image processing, Image viewing, Networking, Web sharing, Data Management and retrieval and Reporting capacity are of course valuable add-ons.

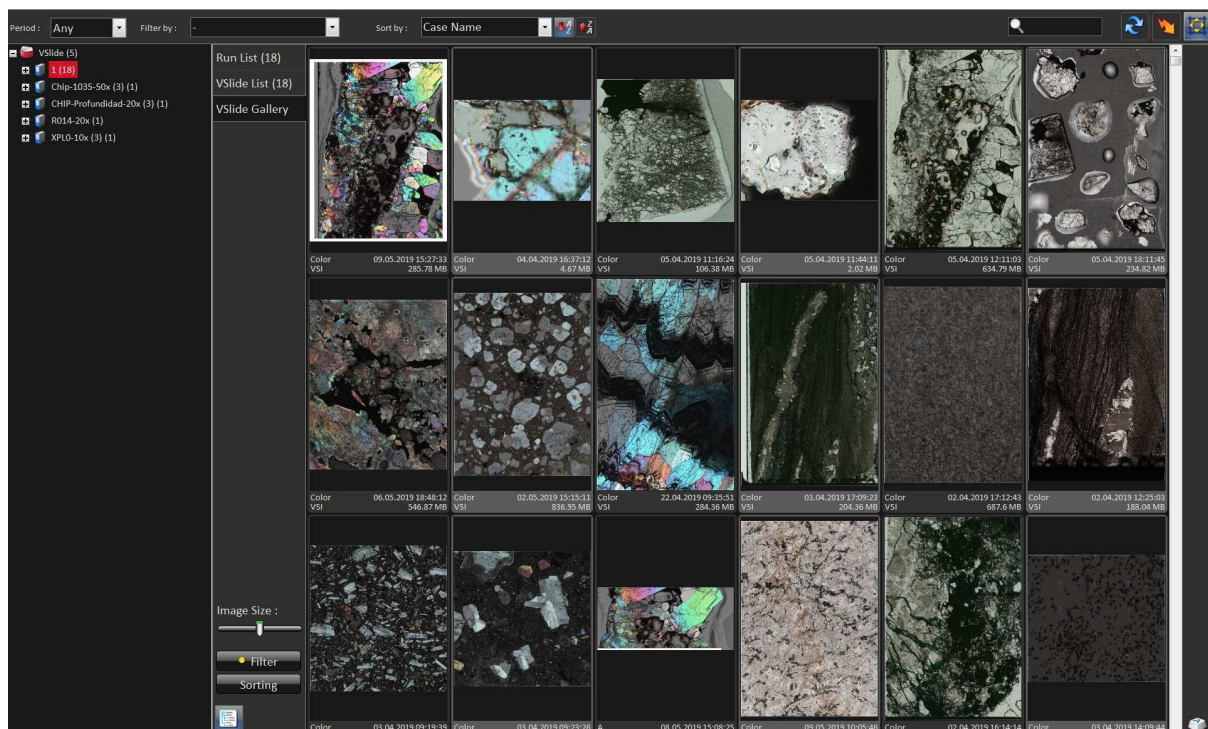


Fig. 3 – Data management and Networking

Application overview

1 – Characterization of petrographic samples

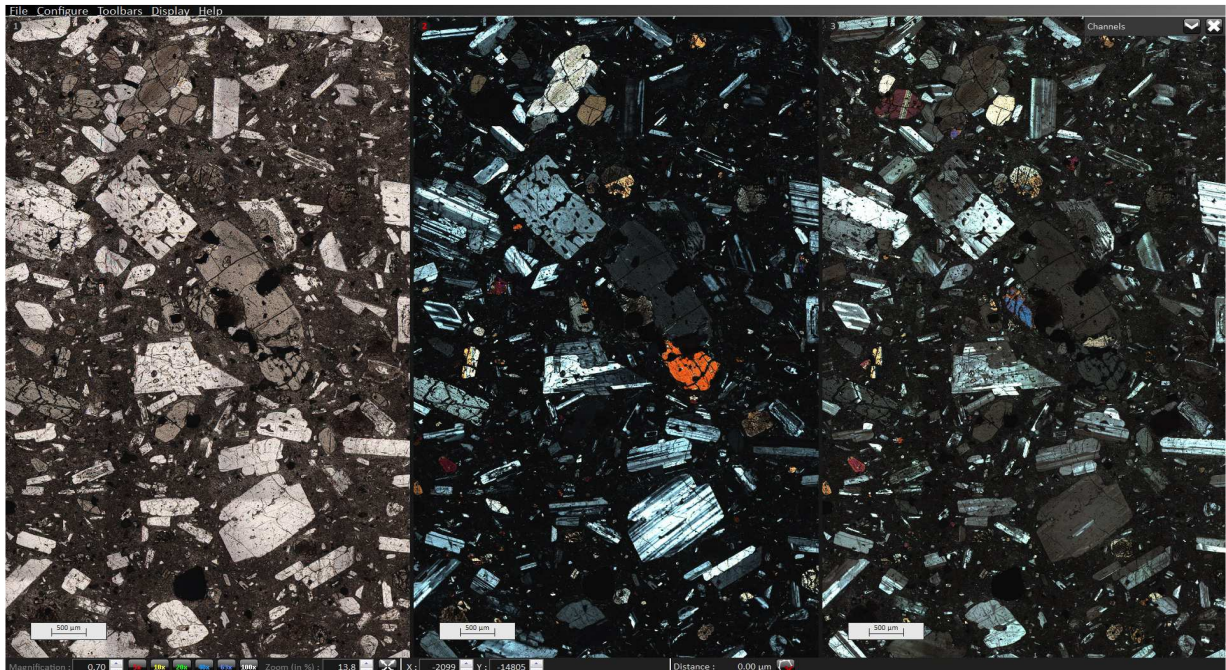


Fig. 4 – Image of a Pyroxene in Plane and Crossed polarized light (two different angles). Petrographic characterization can be completed with the use of a scanning electron microscope.

2 – Analysis of Porosity and Permeability for the Oil & Gas industry

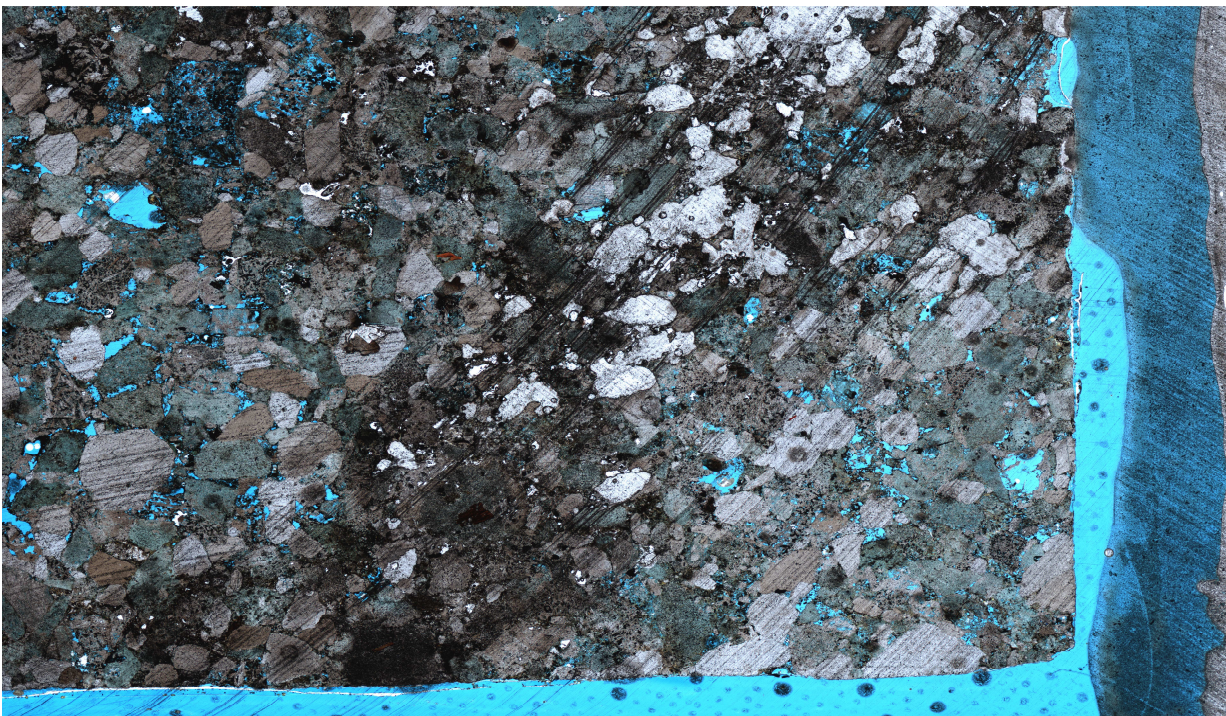


Fig. 5 – High porosity and permeability values are indicators of the oil/gas productivity of a reservoir rock.

3 – Research studies of Fluid Inclusions

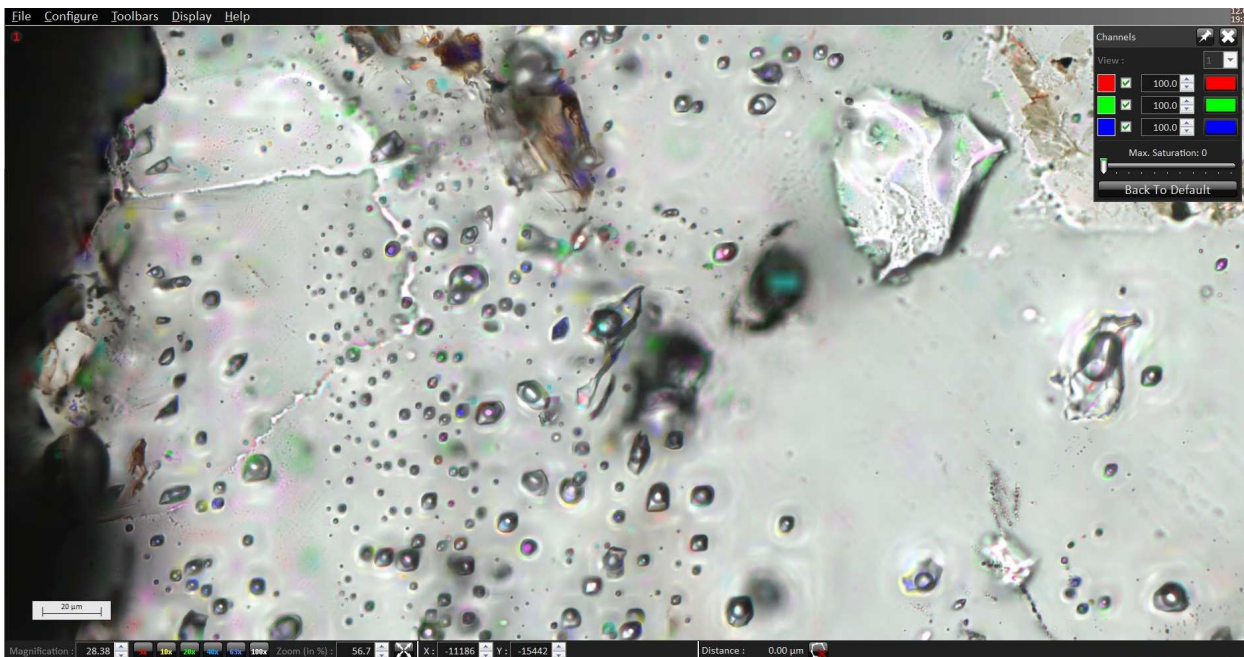


Fig. 6 – Fluid Inclusions (whether primary or secondary) provide insight into the chemical and physical conditions of ore formation and rock genesis. The use of Raman spectroscopy can help to determine their chemical composition.

- More applications coming soon -

