

ΣIGMA™ - Cathodoluminescence Detector

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Date: May 2010

Introduction

The ΣIGMA™ cathodoluminescence (CL) detector provides imaging of those materials that emit light under the influence of the primary electron beam. Analysis by CL is now widespread in geology as many rocks and minerals show this property.

The CL detector is a panchromatic detector that rapidly provides images based upon the CL emission of specimens. Geological materials are widely imaged using a CL detector and a backscattered electron detector (BSD) using dual channel mode.

Zircons are the basis of geochronology and are imaged to reveal internal structures prior to isotopic analysis.

Oil reservoir sandstone sections reveal information on grain provenance and quartz cement distributions that are not available in backscatter imaging.

Carbonates and limestones have presented severe difficulties for all scanned CL methods owing to persistent luminescence. The *indigo*CL detector variant is able to deliver artifact free CL images at fast scan speeds in the presence of carbonates.

Application Areas

Geology

- Oil and gas reservoirs sandstones
- Zircons
- Lead and zinc mining deposits
- Carbonates and limestones
- Hard rock studies

Instrumentation

Following Carl Zeiss NTS's philosophy to protect our customer's investment, the CL and *indigo*CL detectors are compatible with Dual Channel mode and the installed base of SEMs.



We make it visible.

Fig. 1:
Sandstone
imaged with BSD detector
20 kV

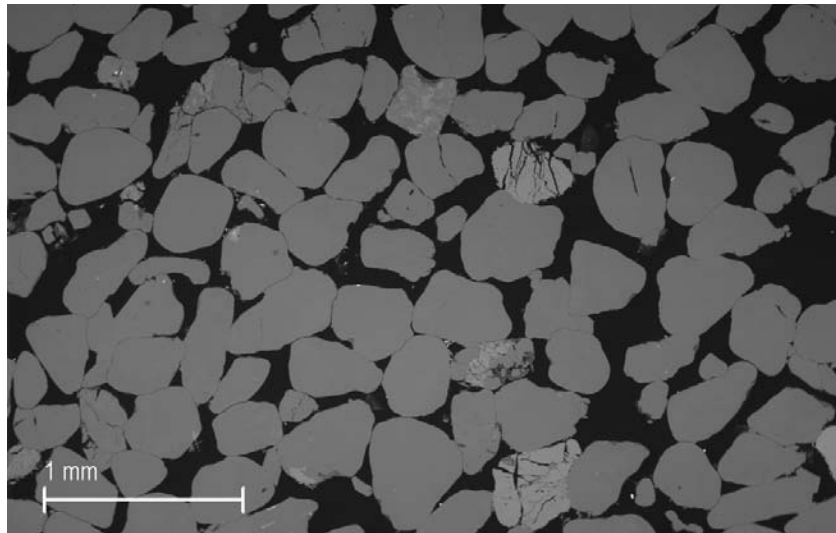
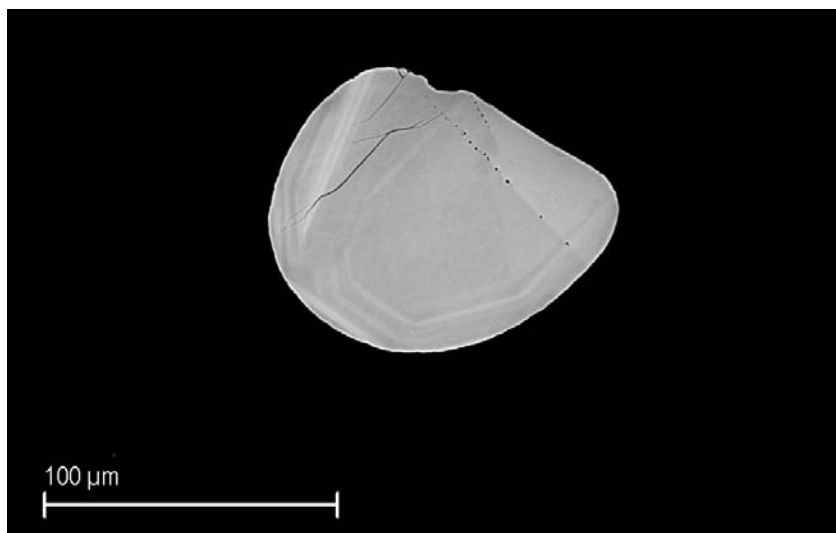


Fig. 2:
Polished section including
carbonates imaged with a
standard CL detector.
This streaking effect is
associated with persistent
luminescence from carbonates.
15 kV



Fig. 3:
Zircon
imaged with BSD detector
20 kV



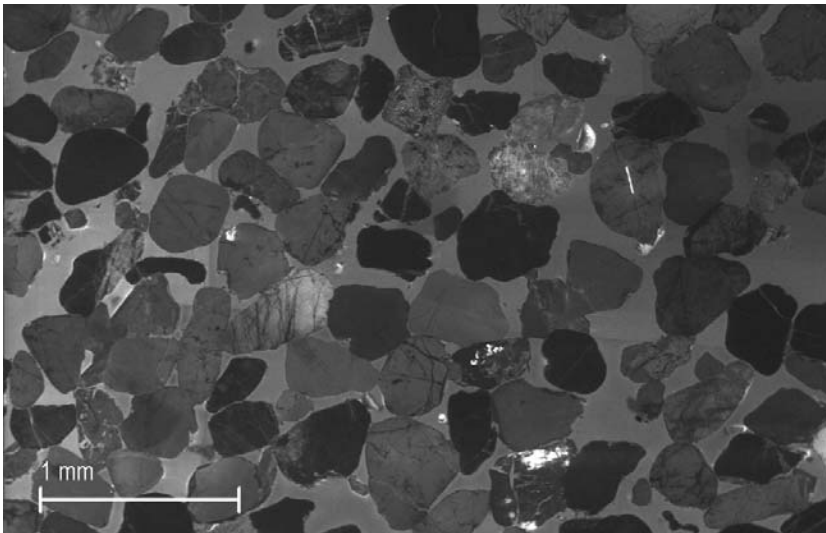


Fig. 4:
Sandstone
imaged with CL detector
20 kV

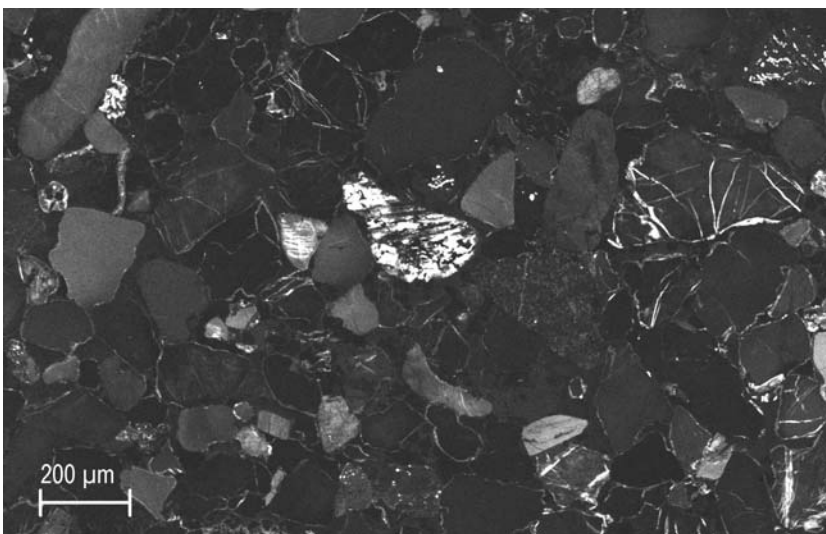


Fig. 5:
The same polished section
including some carbonates
imaged with the indigoCL
detector.
Persistent luminescence is
absent from the image
permitting other features
to be visualised.
15 kV

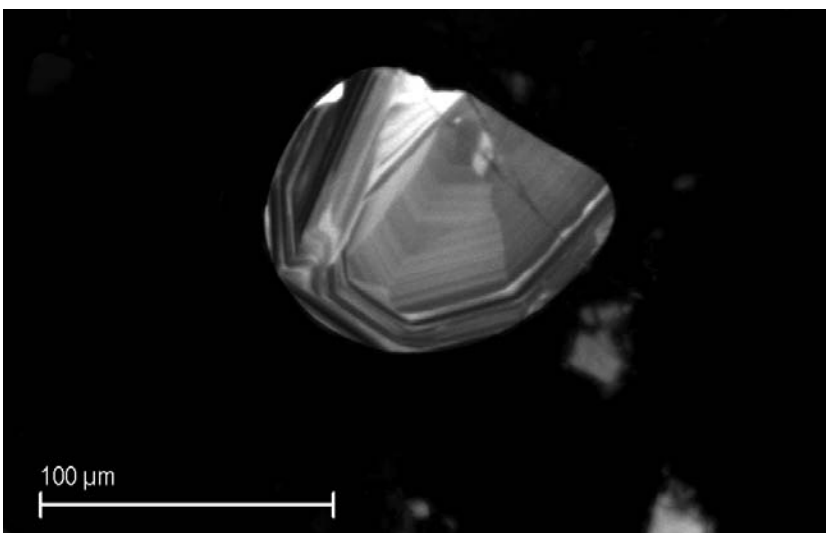


Fig. 6:
Zircon
imaged with CL detector
20 kV

Essential Specifications

The CL and *indigo*CL detectors can be fitted to the EVO® and ΣIGMA™ SEMs.

- Mounting: 20 degree inclined detector port
- CL: For fast scanned CL of most materials
- *indigo*CL: For fast scanned CL of polished sections of rocks that include carbonates
- Functions in Dual Channel mode



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