

# EVO® - Cathodoluminescence Detector

Author: Dr. Stewart Bean

Date: May 2010

## Introduction

The EVO® 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

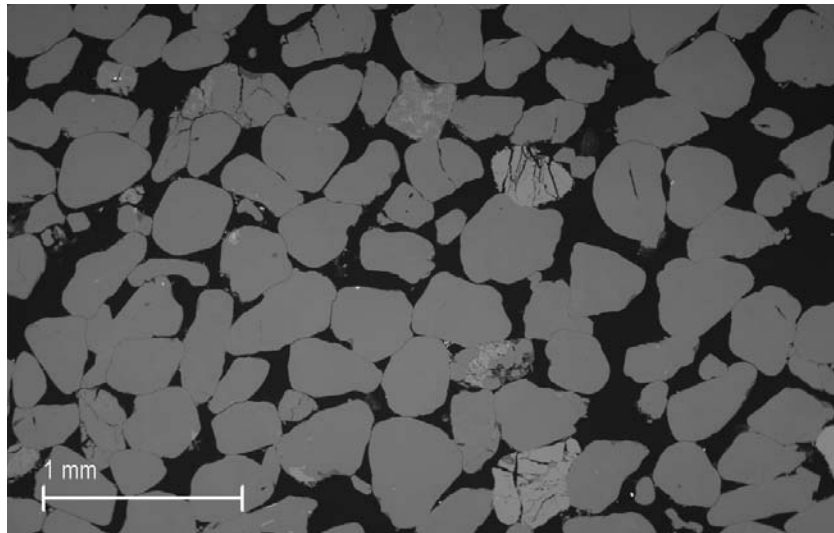


Fig. 2:  
Polished section including  
carbonates imaged with a  
standard CL detector.  
This streaking effect is  
associated with persistent  
luminescence from carbonates.  
15 kV

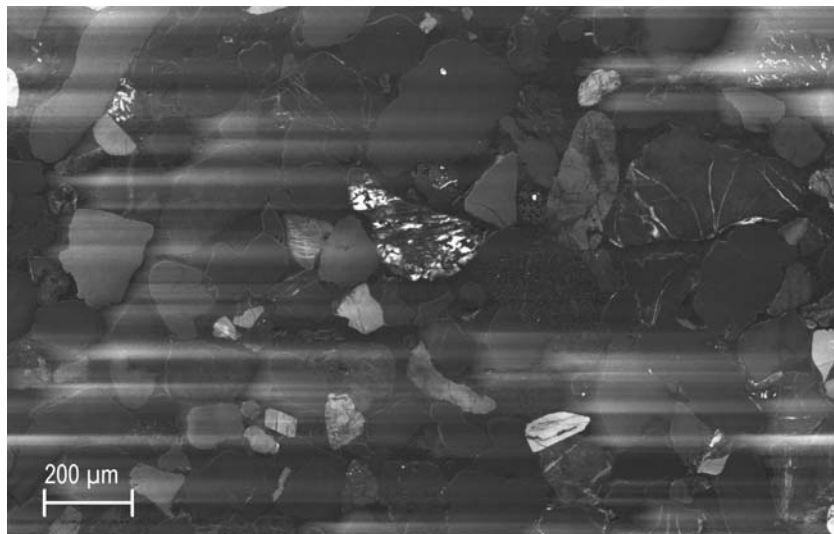
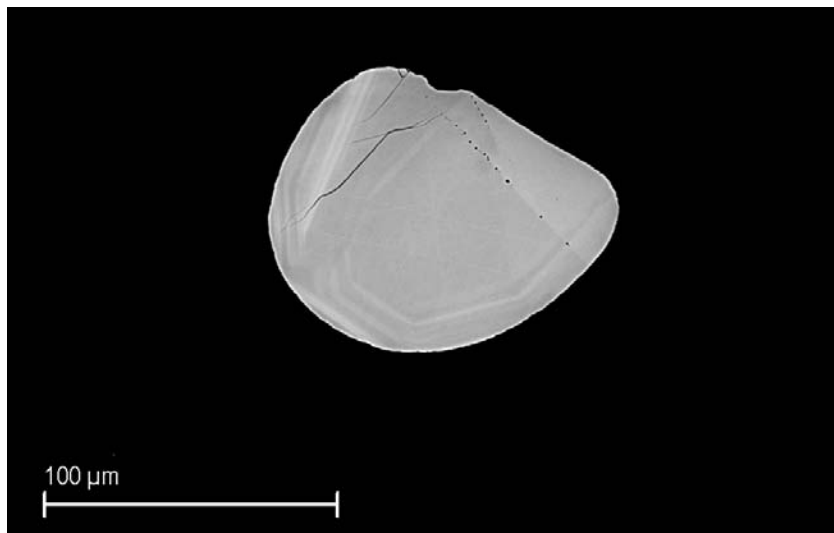


Fig. 3:  
Zircon  
imaged with BSD detector  
20 kV



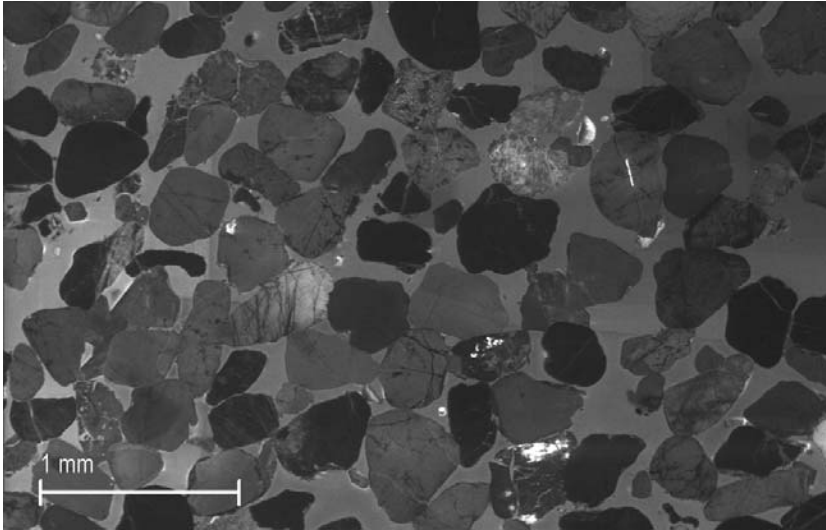


Fig. 4:  
Sandstone  
imaged with CL detector  
20 kV

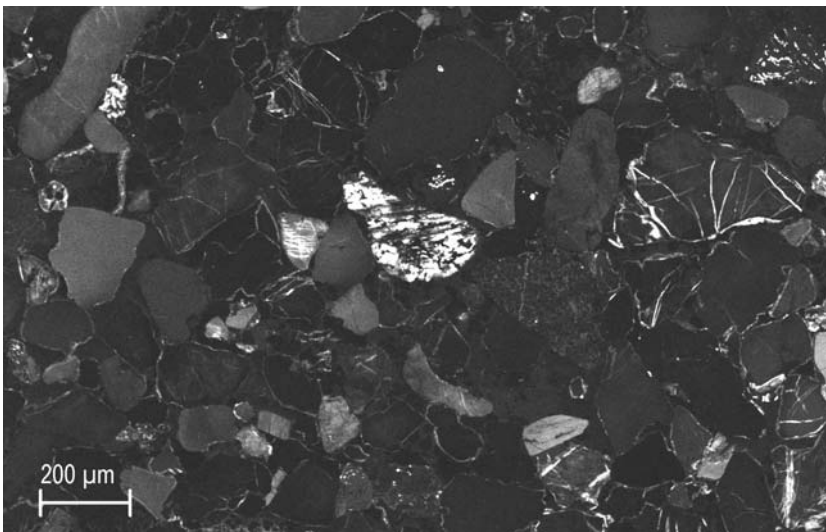


Fig. 5:  
The same polished section  
including some carbonates  
imaged with the indigoCL  
detector.  
Persistent luminescence is  
absent from the image per-  
mitting other features to be  
visualised.  
15 kV

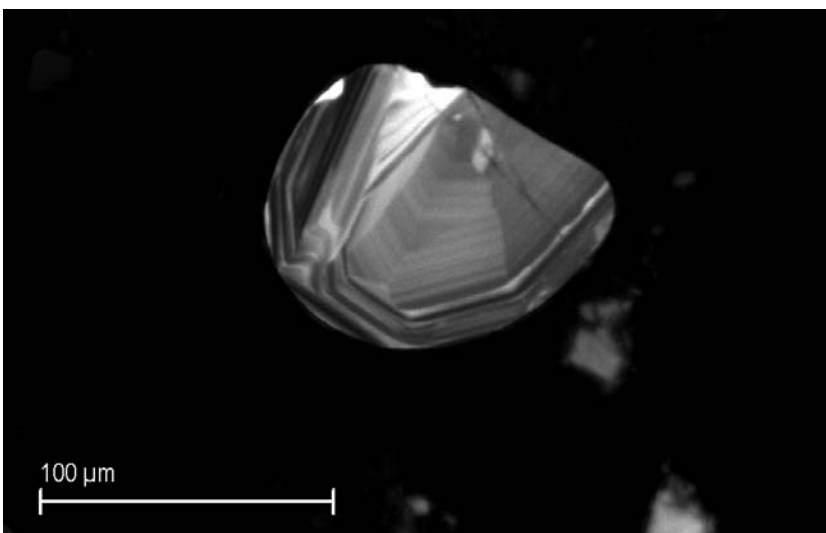


Fig. 6:  
Zircon  
imaged with CL detector  
20 kV

## Essential Specifications

The CL and *indigo*CL detectors can be fitted to the EVO® and SIGMA™ 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



EVO® MA 10



EVO® MA 15



EVO® MA 25

## Maximum Information – Maximum Insight

More than 160 years of experience in optics has laid the foundation for pioneering electron and ion beam microscopes from Carl Zeiss. Superior integration of imaging and analytical capabilities provides information beyond resolution, unlocking the best kept secrets of your sample.

With a broad technology portfolio Carl Zeiss provides instruments both tailored to your requirements and adaptable to your evolving needs. With our highly versatile application solutions we endeavor to be your partner of choice.

Superbly equipped, regional demo centers provide you with access to our applications expertise developed in collaboration with world-class partners in industry and academia. Global customer support is provided by the Carl Zeiss Group together with an extensive network of authorized dealers.

Our mission at all times: Maximum Information – Maximum Insight.

### Carl Zeiss NTS GmbH

Carl-Zeiss-Str. 56  
73447 Oberkochen  
Germany  
Tel. +49 73 64 / 20 44 88  
Fax +49 73 64 / 20 43 43  
info@nts.zeiss.com

### Carl Zeiss NTS, LLC

One Corporation Way  
Peabody, MA 01960  
USA  
Tel. +1 978 / 826 1500  
Fax +1 978 / 532 5696  
info-usa@nts.zeiss.com

### Carl Zeiss NTS Pte. Ltd.

50 Kaki Bukit Place #04-01  
Singapore 415926  
Singapore  
Tel. +65 65 67 / 30 11  
Fax +65 65 67 / 51 31  
info.sea@nts.zeiss.com

### Carl Zeiss NTS Ltd.

511 Coldhams Lane  
Cambridge CB1 3JS  
UK  
Tel. +44 12 23 41 41 66  
Fax +44 12 23 41 27 76  
info-uk@nts.zeiss.com

### Carl Zeiss NTS S.a.s.

Zone d'Activité des Peupliers  
27, rue des Peupliers -  
Bâtiment A  
92000 Nanterre  
France  
Tel. +33 1 41 39 92 10  
Fax +33 1 41 39 92 29  
info-fr@nts.zeiss.com

[www.zeiss.com/nts](http://www.zeiss.com/nts)



We make it visible.