EsB Detector
Make Sub-Surface Information and Nano-Scale Composition visible.
EsB Detector
Make Sub-Surface Information and Nano-Scale Composition visible with the EsB Detector

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Energy specific separation of backscattered Electrons (BSE)

Introduction

The Energy selective Backscattered (EsB) Detector is suitable for clear compositional contrast. It is an annular shaped in-column detector that is located above the In-lens detector. The ability to detect BSE makes sub-surface information and nano-scale composition visible.
To prevent detection of SE, a filtering grid is installed in front of the EsB Detector. By switching on the filtering grid voltage, the SE will be rejected and only BSE will be detected. Below a landing energy of 1.5 kV, the filtering grid has the additional function of selecting the desired energy of the BSE. This means the threshold energy of inelastically scattered BSE can be selected to enhance contrast and resolution.
Higher landing energy means deeper penetration and high energy loss. The GEMINI lens enables the EsB Detector to detect the very small angular distribution of the „Low loss BSE“ electrons, which are characteristic for all kinds of compositions. Clean samples are mandatory, due to the fact that the low loss scattering happens in the Angstrom range of scattering volumes.

Benefits

- Energy specific separation of BSE
- Nano-scale compositional information in combination with high spatial resolution
- Sub-surface information visible
- Not sensitive to charging
- Less sensitive to edge contrast

Operation

The EsB Detector is fully software-controlled. The filtering grid can be adjusted through software to reject SE and to select the range of detected BSE up to a landing energy of 1.5 kV.

Specification

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
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<tbody>
<tr>
<td>Filtering grid adjustment</td>
<td>0 V - 1.5 kV</td>
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Availability

The EsB Detector is available for the following microscopes:
- ULTRA series
- 1540 EsB
- MERLIN series
- NEON EsB
- AURIGA series
Upgrade path

<table>
<thead>
<tr>
<th>Software</th>
<th>Upgrade Info</th>
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<tbody>
<tr>
<td>SmartSEM 5.03 or higher</td>
<td>In operation with MERLIN:</td>
</tr>
<tr>
<td>SmartSEM 5.04 or higher</td>
<td></td>
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A system preventive maintenance performed within the last 12 months is mandatory. The retrofit must be performed by a ZEISS-authorised service engineer. Application training is recommended. For further information, contact: microscopy@zeiss.com

<table>
<thead>
<tr>
<th>Part</th>
<th>Ordering no.</th>
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<tr>
<td>Upgrade Kit EsB OSE</td>
<td>346500-9014-990</td>
</tr>
<tr>
<td>Upgrade Kit EsB NSE</td>
<td>349506-9001-990</td>
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Figure 1

The EsB detector, the main part of the upgrade kit.

Figure 2

Uncoated pegmatite rock as imaged with conventional Rutherford backscattering electrons at 12 kV.

Figure 3

The same area of pegmatite rock as imaged by the EsB detector at an electron impact energy of 1.09 kV and with an energy window width of 190 eV.