SEM-EDS characterisation and chemical analysis

DELTA offers third party SEM-EDS characterisation and chemical analysis services focussed within electronics grade materials and microelectronics components

Nova 200 NanoSEM

The Nova 200 NanoSEM analytic facility is an ultra-high resolution FEG-SEM with low vacuum imaging capabilities for particular nano-scale characterisation of charging and/or out-gassing nano-scale materials.

Application specific imaging is provided by a set of individual detectors including SE, TLD-SE, BSE and GAD detectors. Combined with the FEG-type electron gun source the Nova 200 NanoSEM offers superior performance in terms of image contrast and resolution by characterisation of for instance semiconductor structures, which by the nature of materials are complicated to deal with.

Sample preparation

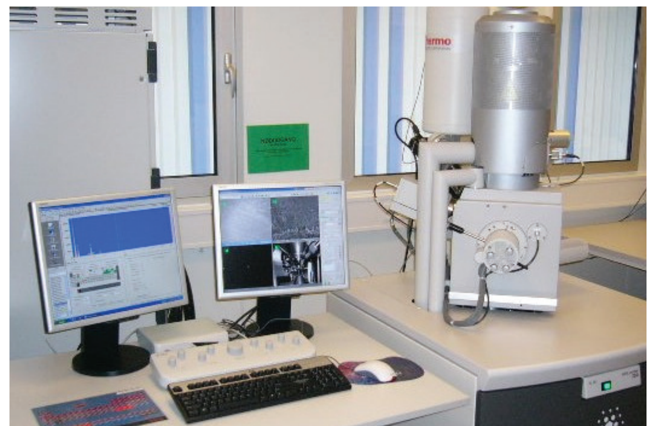
Successful characterisation of materials and microelectronics components requires skills and special analytical tools for sample preparation.

DELTA operates a complete component laboratory and offers on-site sample preparation like:

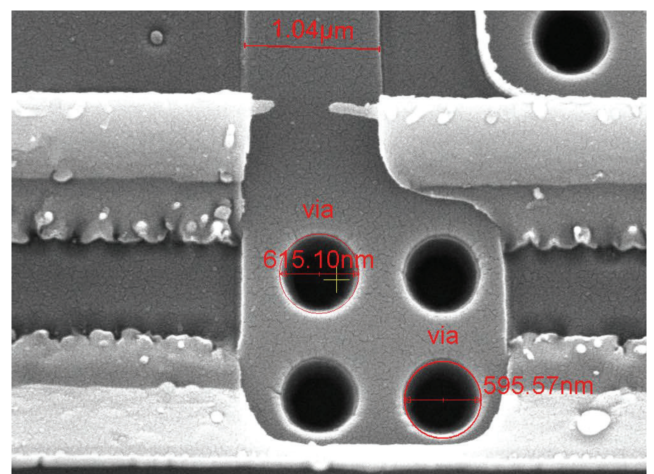
- Decap of component housing
- Package or die cross sectioning
- Die delaminating by RIE etching
- Selective wet chemical etching/staining
- FIB device modification by subcontractor
- Gold or carbon sample sputtering

Typical characterisation issues

- SEM wafer qualification
- Interconnects examination, wire bonds
- Failure site examination, high magnification
- Semiconductor technology studies, die level
- Cross section examination, high magnification
- Fracture/crack examination



Nova 200 NanoSEM



SEM view RIE deprocessed die, 30,000x magnification.

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Performance

- Electron beam source: FEG, Field Emission Gun
- Acceleration voltage: 0-30 kV
- Magnification: >300,000x
- Resolution: 1 nm, sample dependent
- Chamber size: 284 mm left to right
- Stage movement: X-50 mm, Y-50 mm, Z-25 mm, R-360 degree

EDS, chemical analysis

The EDS detector integrated to the Nova 200 NanoSEM is a THERMO low-element type EDS detector offering the possibility of both qualitative and quantitative chemical analysis of elements from Boron (B) and up only limited by the maximum acceleration electron beam voltage of 30 kV.

The software package is offering some very useful options like:

- Point and shoot, identification and quantification
- Chemical elements mapping, multi-coloured
- Image processing options

Chemical analysis issues

- Alloy type and composition determination
- Identification of contamination/corrosion deposits
- Examination of wire bond intermetallics
- Migration studies

For further information please contact:

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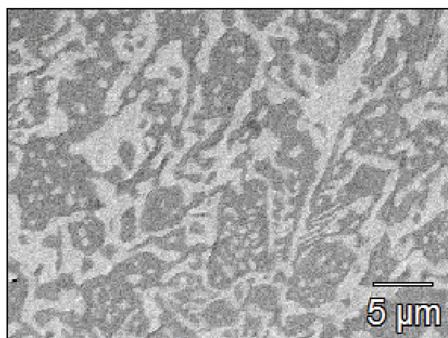
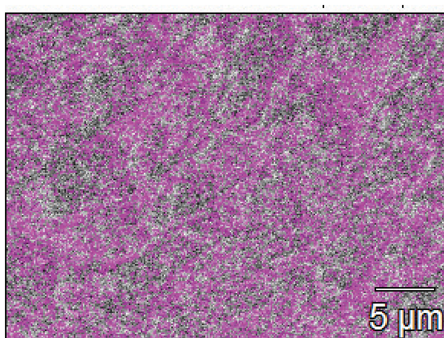
EDS chemical elements, dot map examples

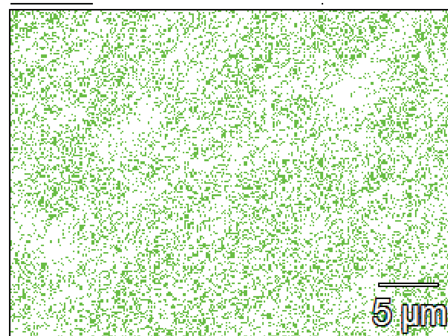
Lead free Tin-Bismuth alloy type solder joint cross section microstructure, EDS chemical analysis dot map examples.



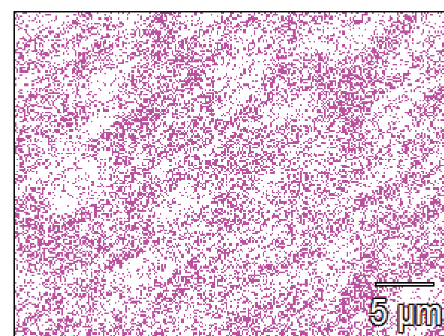
Sample grey-scale image.



Bismuth, Bi dot map image overlay.



Tin, Sn sample dot map.



Bismuth, Bi sample dot map.

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