Examples of EDS & BEX on ‘WDS Applications’

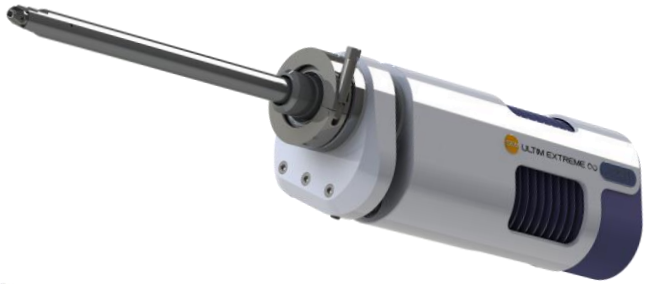
Our Solutions for ‘WDS Applications’

High Spectral Resolution

Resolving peak overlaps with EDS

With **Ultim Max Infinity** and **AZtec,** our unique hardware and software technology produces results which match WDS on many applications.

Low Detection Limits



Analysing low concentrations of light elements with EDS

With **Ultim Extreme Infinity,** our detectors are sensitive to very low signal levels and can characterise sub-micron structures.

Visualising minor and trace elements with BEX

With **Unity,** our unique BEX detector captures very high signal levels enabling fast mapping of trace elements.

Examples follow

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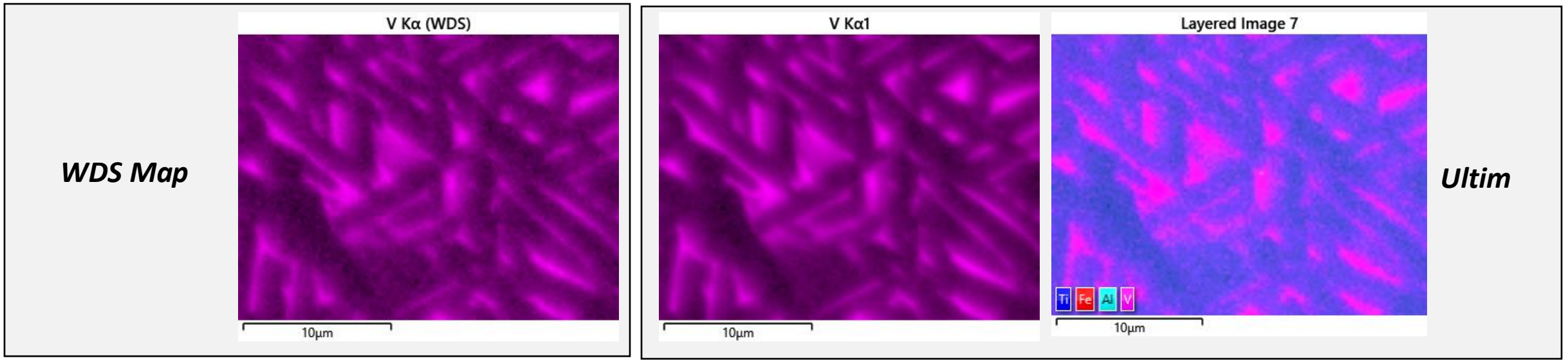
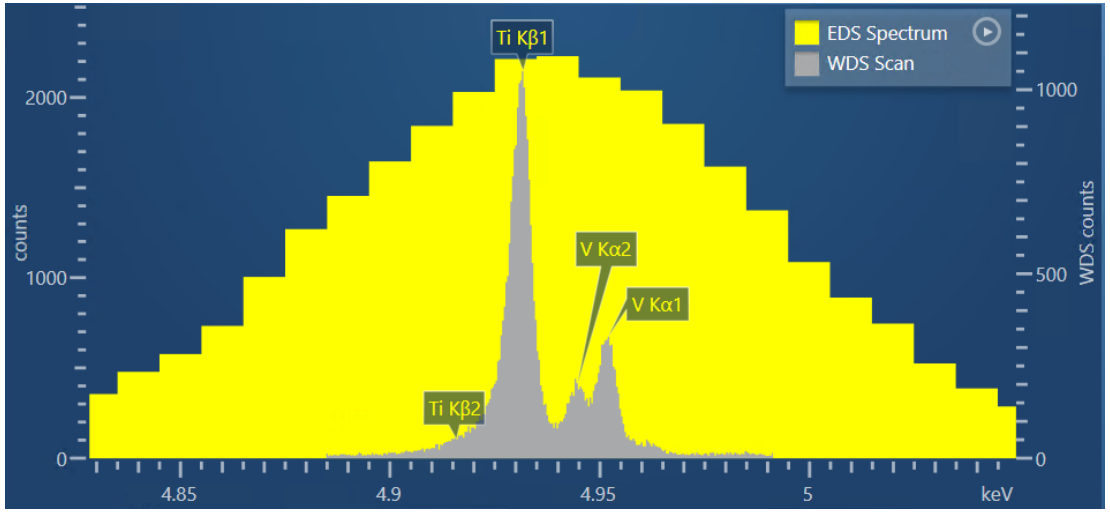
Examples of EDS & BEX on ‘WDS Applications’

Resolving peak overlaps with EDS





Peak positions shown: Ti Kb 4.932keV & V Ka 4.952keV

Challenge: Resolving a 20 eV offset

AZtec and our unique EDS technology provide the same information as WDS when dealing with difficult overlaps including peaks which have very close positions such as this Ti64 alloy.

We can also map much more of the sample using the higher speed of EDS.

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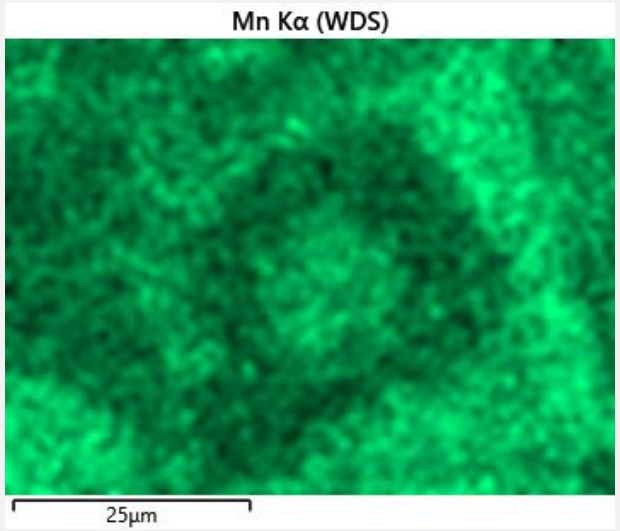
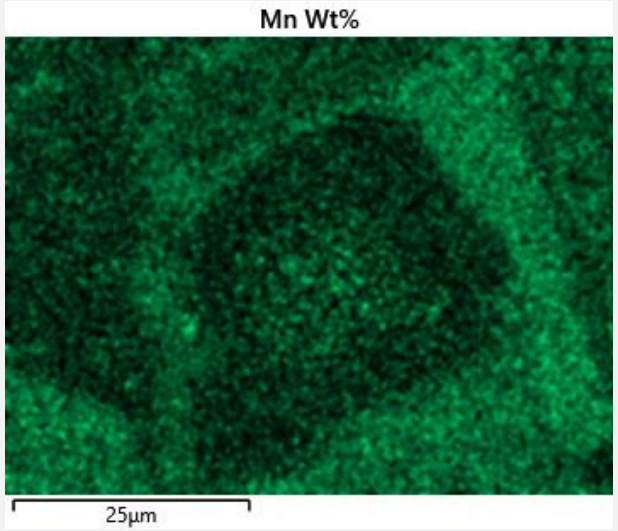
Resolving peak overlaps with EDS

WDS Map

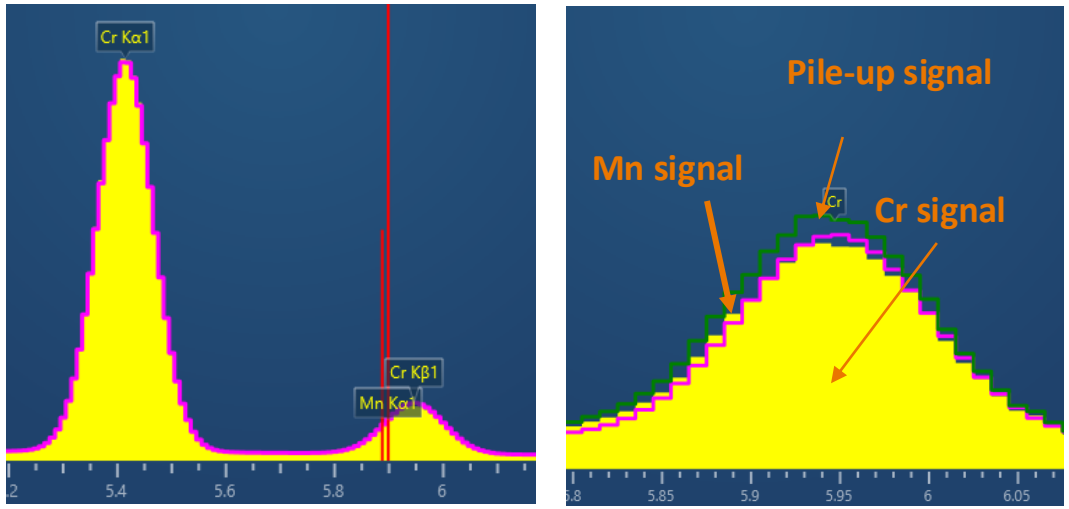




Ultim Max + QuantMap

Challenge: 0.1-1 wt% Mn concentration

AZtec and our unique EDS technology provide the same information as WDS when dealing with difficult overlaps and small signals from low concentrations. The example shown is analysis of a furnace slag sample.



Mn signal resolved from CrKβ overlap

OXFORD INSTRUMENTS

Resolving peak overlaps with EDS

Quant Results View

Element	Signal Type	Line	Apparent Concentration	Intensity Correction	k Ratio	Wt%	Wt% Sigma	Oxide %	Number of Ions	Standard Name	Facto
O		K series				26.7372			4.00		
Al	EDS	K series	0.04	0.49	0.00032	0.0906	0.0051	0.1712	0.01	Al2O3	Yes
Si	EDS	K series	0.38	0.58	0.00297	0.6425	0.0049	1.3744	0.05	SiO2	Yes
P	EDS	K series	11.90	0.99	0.06654	11.9584	0.0107	27.4005	0.92	GaP	Yes
S	EDS	K series	0.19	0.72	0.00163	0.2631	0.0045	0.6569	0.02	FeS2	Yes
Ca	EDS	K series	0.36	1.05	0.00321	0.3423	0.0042	0.4789	0.02	Wollastonite	Yes
La	EDS	L series	13.66	0.94	0.12260	14.4605	0.0255	16.9587	0.25	LaB6	Yes
Ce	EDS	L series	26.04	0.92	0.24236	28.2285	0.0306	33.0632	0.48	CeO2	Yes
Pr	EDS	L series	2.32	0.87	0.02317	2.6558	0.0259	3.1081	0.05	Pr (v)	Yes
Nd	EDS	L series	7.51	0.87	0.07505	8.6431	0.0277	10.0812	0.14	Nd (v)	Yes
Sm	EDS	L series	0.87	0.84	0.00874	1.0402	0.0240	1.2062	0.02	Sm (v)	Yes
Gd	EDS	L series	0.42	0.78	0.00415	0.5314	0.0215	0.6125	0.01	Gd (v)	Yes
Pb	EDS	M series	0.20	0.70	0.00189	0.2922	0.0197	0.3148	0.00	PbTe	Yes
Th	EDS	M series	2.64	0.80	0.02559	3.2958	0.0183	3.7503	0.03	ThO2	Yes
U	EDS	M series	0.02	0.79	0.00018	0.0227	0.0162	0.0273	0.00	U	Yes
Total						99.2042		99.2042	2.01 (Cation sum)		

Analysis of Monazite standard

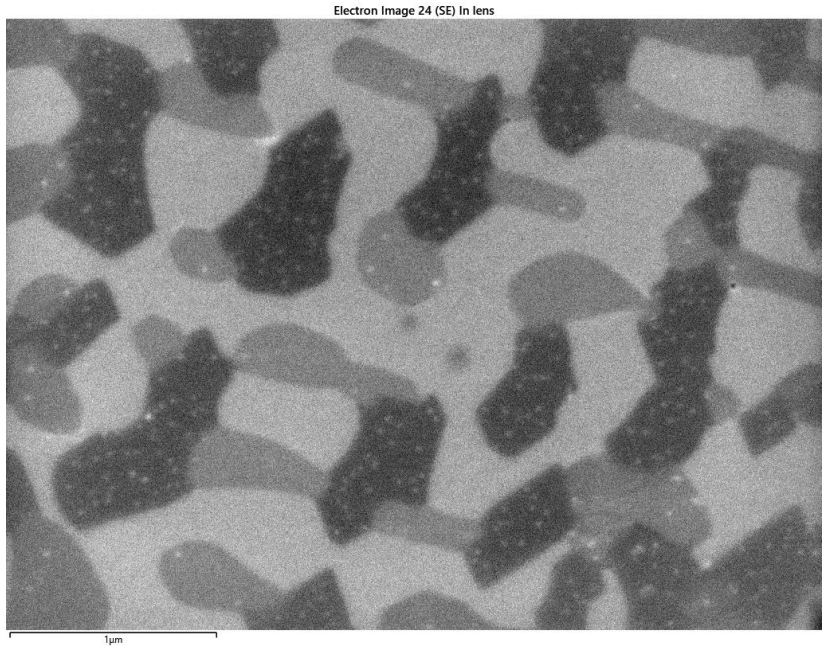
Ultim Quant Data

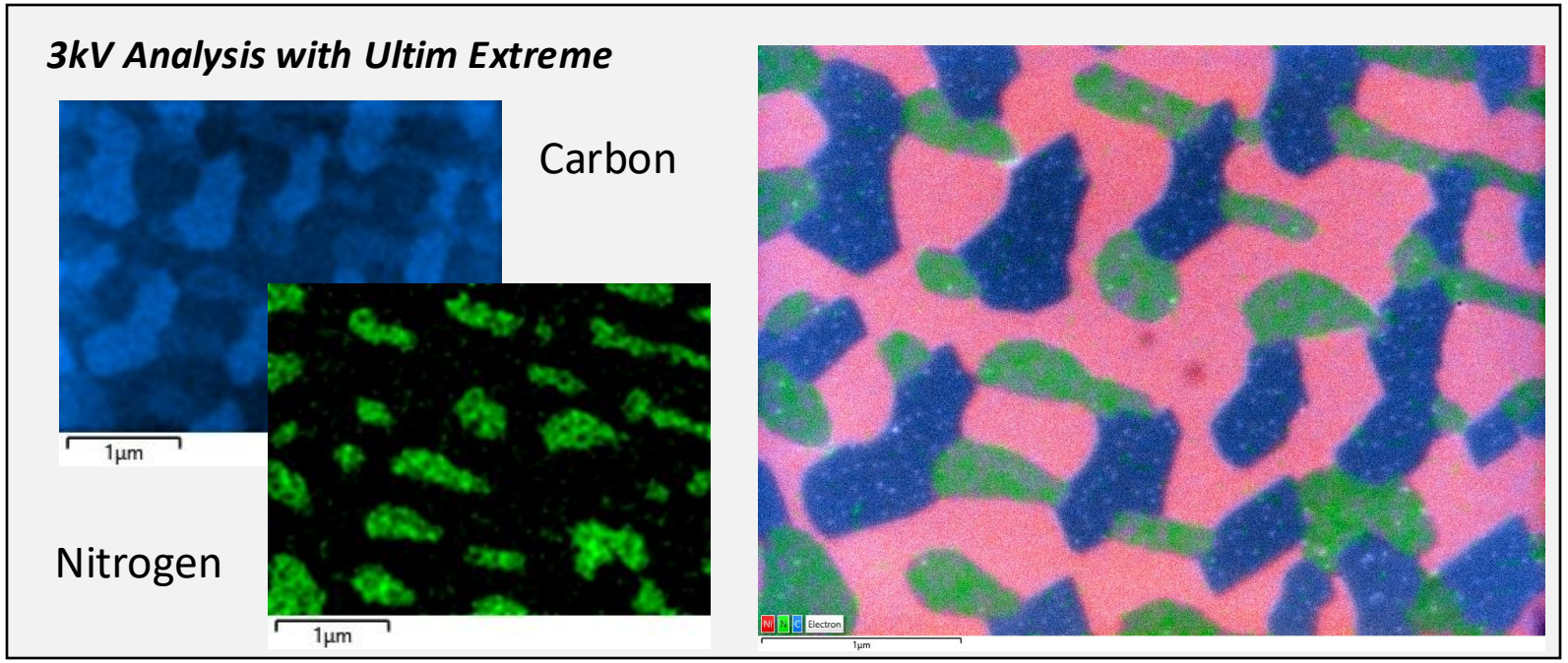
Challenge: Useful Quant Measurements from challenging mineral samples

AZtec and our unique EDS technology deliver comparable results to WDS on samples, such as monazite mineral, where there are complicated overlaps of signal from multiple Rare Earth Elements including trace elements like Uranium and Thorium.

OXFORD INSTRUMENTS

Analysing low concentrations of light elements with EDS





Challenge: Characterising small signals from sub-micron structures

Ultim Extreme is capable of capturing data from low intensity signals including light element phases such as nitrides, carbides & carbonitrides in structural materials. Structures this size wouldn't be possible to analyse with WDS due to the higher kV beam conditions.

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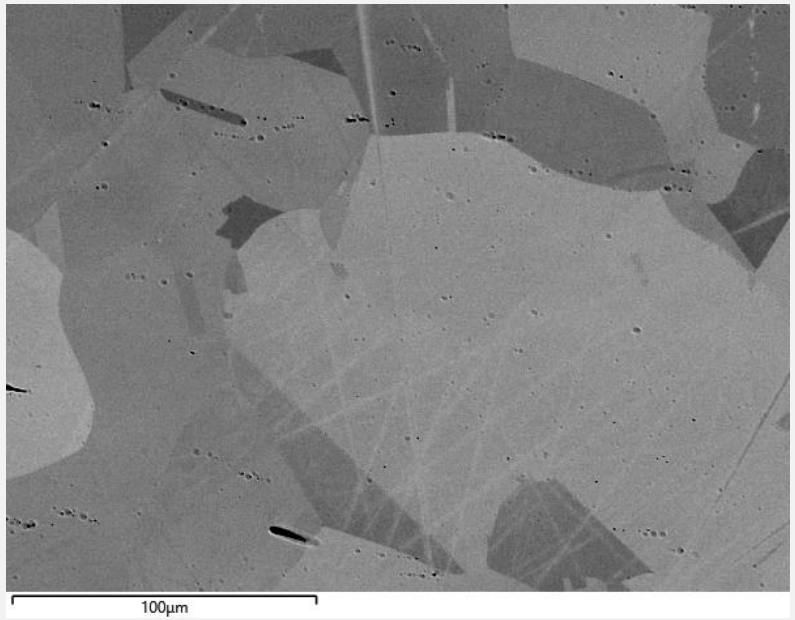
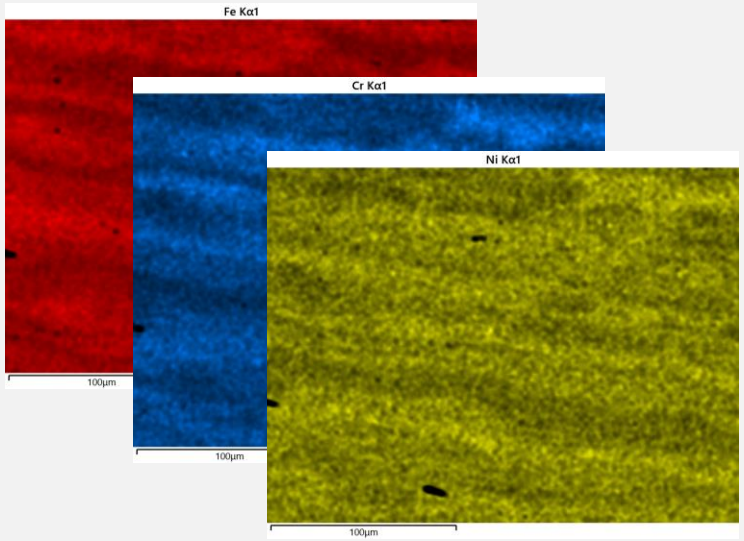
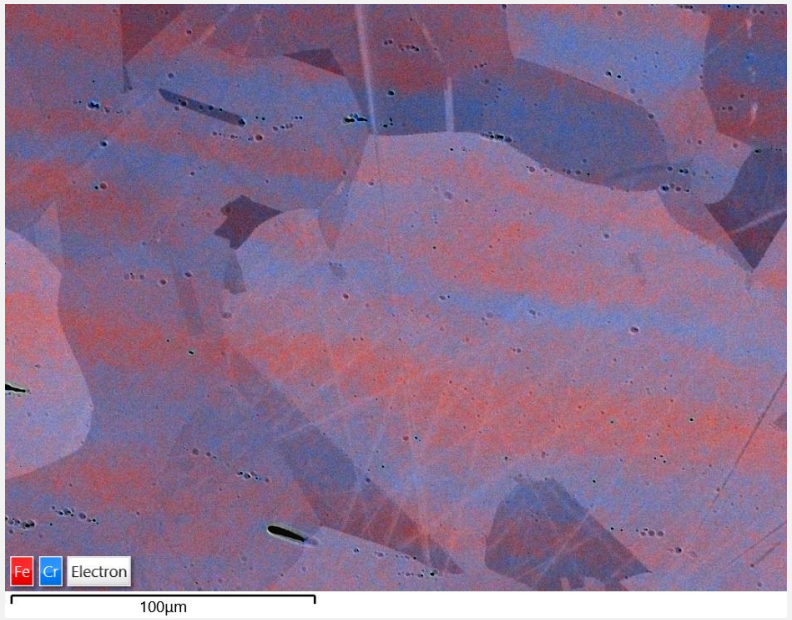
Visualising minor and trace elements with BEX



Unity, Ultim & AutoPhaseMap





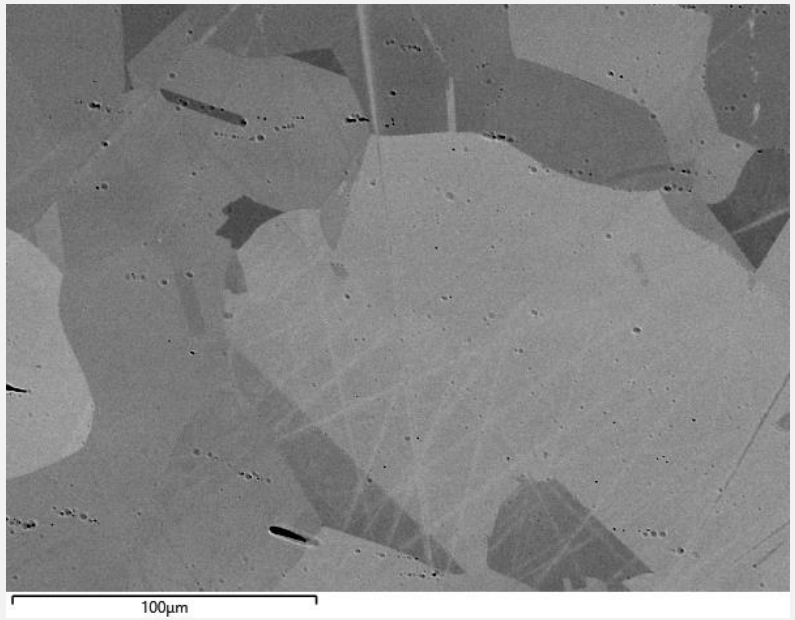
Ni 0.1wt% delta **Cr** 0.4 wt% delta

Challenge: Mapping elemental concentrations below 1 wt%

Unity captures incredibly high signal levels which allow us to detect segregation of Cr & Ni in steel in maps collected in just a few minutes. With Unity, we can use Cartography to extend this analysis to mm-scale samples, where WDS would require days to cover a similar area.

OXFORD INSTRUMENTS

Visualising minor and trace elements with BEX



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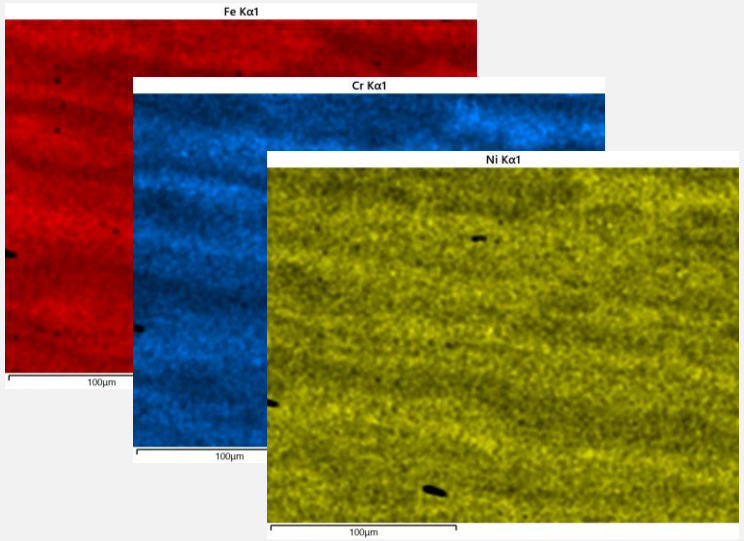

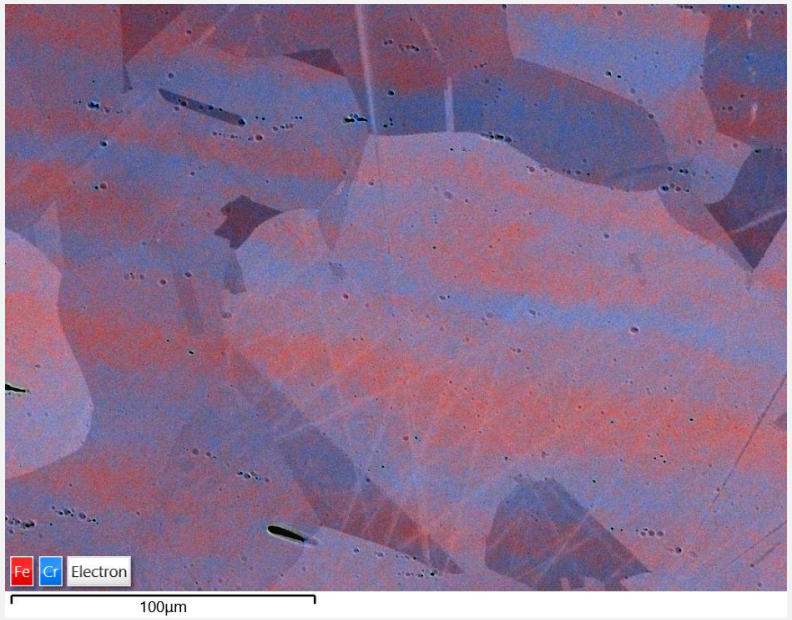

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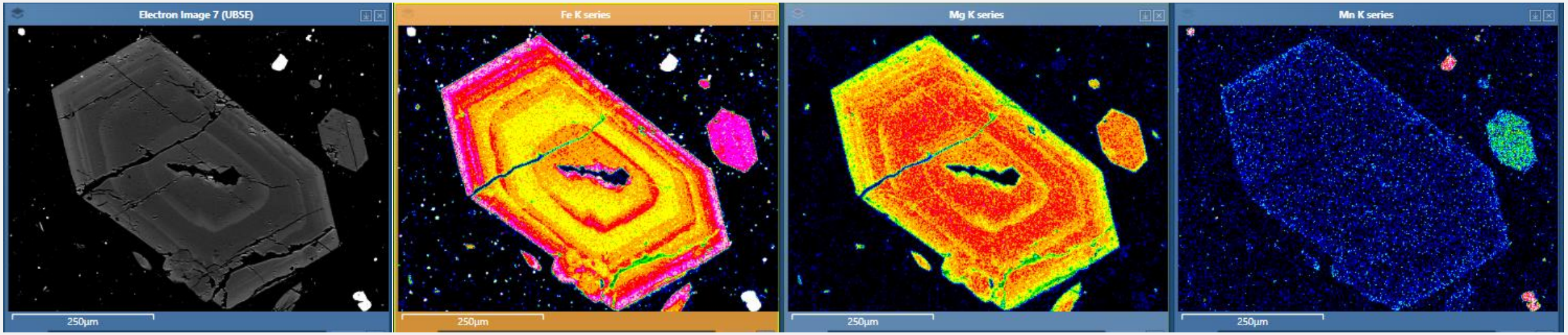
Visualising minor and trace elements with BEX

Unity & Ultim



Mn zonation <0.7 wt%

Challenge: Mapping elemental concentrations below 0.7 wt%

Unity captures incredibly high signal levels which allow us to visualise zonation of trace levels of Mn in this porphyritic dacite lava from Mt. Pinatubo, Philippines. Data was acquired in a single frame BEX acquisition (<20min) where equivalent WDS data would take at least 1 hour.

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