Imaging

Physical Sciences Electron Microscopy

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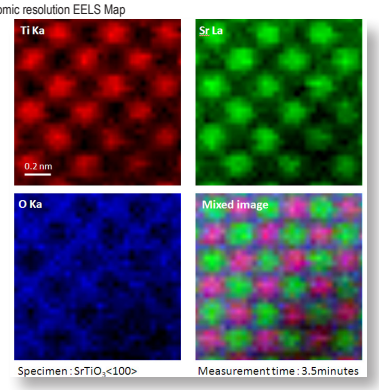
ePSIC Technical Information

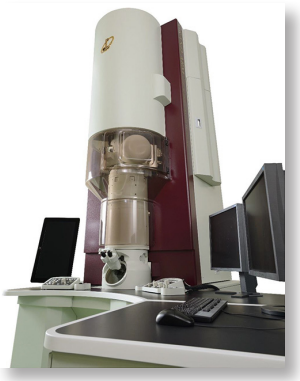
ePSIC – electron Physical Sciences Imaging Centre

The electron Physical Sciences Imaging Centre (ePSIC) is a collaboration between Johnson Matthey, the University of Oxford and Diamond Light Source. Johnson Matthey and Oxford University have each contributed cutting-edge microscopes from JEOL, located at Diamond Light Source, to support research in the Physical Sciences for a broad user base.

Oxford University have provided a unique JEOL 300kV electron microscope dedicated to atomic scale imaging at world-leading resolution and Johnson Matthey have installed a world-leading JEOL double-EDX and EELS capable microscope dedicated to chemical analysis with atomic scale resolution.

Techniques available include EDX, EELS, atomic scale imaging and electron diffraction.





Applications

- High resolution imaging and spectroscopy;
- Atomic resolution elemental mapping by EELS and XEDS;
- Studies of catalysts and other nanoparticulate systems;
- Ultra High Resolution TEM and STEM Imaging in several modes over a range of voltages;
- Studies of catalysts and other nanoparticulate systems;
- Low dimensional materials.

Benefits for Physical Sciences

- Atom-by-atom imaging resolution for chemical mapping of materials;
- High brightness, narrow energy spread, and ultra stable emission greatly enhance results
- Reduced installation and operating requirements: environmental instrument enclosure provides optimal thermal and acoustic shielding
- Optimised connectivity to latest hardware and software developments
- Can be configured for ultrahigh resolution imaging or analytical applications for high sensitivity and *in situ* analysis according to the user's needs.

For further information please contact the Diamond Industrial Liaison Office on

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JM Johnson Matthey

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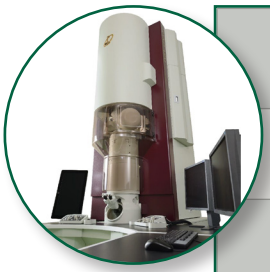
ePSIC Applications

Technical Specifications of JEOL ARM200F

Johnson Matthey

Resolution	STEM ADF Mode	78 pm (at 200kV, with cold FEG)
	TEM (point resolution)	190 pm (at 200kV)
Magnification	STEM	x 200 to x 150,000,000
	TEM	x 50 to x 2,000,000
Electron Source	Emitter	W cold field
	Accelerating voltage	200 to 80kV
Specimen System	Stage	Eucentric Side Entry Goniometer stage Piezo X, Y, Z control
	Specimen size	3 mm
	Maximum tilt angle	X axis: ±25° Y axis: ±25°
	Travel Range (mm)	X,Y: ±1, Z:±0.1
Aberration Corrector	Probe forming system Cs-corrector	Yes
	Image forming system Cs-corrector	No
	Additional Options	Double EDS 100mm^2 high solid angle detectors Gatan Model 965 GIF Quantum ER Dual EELS Gatan one view Digital Camera Gatan Orius SC200D Digital Camera TEM/STEM Tomography acquisition Module Model 912 Tomography Holder Gatan 914 Cryo-Tomography holder

Technical Specifications of JEOL ARM300F



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Resolution	STEM ADF Mode	47 pm (at 300kV, with cold FEG)
	TEM (point resolution)	50 pm (at 300kV)
Magnification	STEM	x 200 to x 250,000,000
	TEM	x 50 to x 4,000,000
Electron Source	Emitter	W cold field
	Accelerating voltage	300, 200, 100, 80 and 60kV
Specimen System	Stage	Eucentric Side Entry Goniometer stage Piezo X,Y,Z control
	Specimen size	3 mm
	Maximum tilt angle	X axis: ±25° Y axis: ±25°
	Travel Range (mm)	X,Y: ±1, Z:±0.1
Aberration Corrector	Probe forming system Cs-corrector	Yes (ETA Type)
	Image forming system Cs-corrector	Yes (ETA Type)
	Additional Options	Gatan one view Digital Camera Multiple STEM detectors High resolution Direct detection TEM Camera

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