**Introduction of New Products**

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**Electron microscope**

**JEM-2100**

The JEM-2100 is an analytical electron microscope which not only offers transmission electron microscope (TEM) images and diffraction patterns, but also incorporates a computer control system which can integrate a scanning transmission electron microscope (STEM) image observation device, an energy dispersive X-ray spectrometer (JED-2300T), and an electron energy-loss spectrometer (EELS) in any combination.

**High stability:** High stability of the high voltage and beam current, together with the excellent lens system, achieves a high resolution of 0.19 nm at 200 kV.

**New frame structure for the column:** This new base frame greatly reduces the effect of vibration on the instrument.

**Analytical electron microscope:** The EDS system uses a new detector which is designed for a solid angle of 0.28 sr and a take-off angle of 24.1°, allowing highly accurate analysis and quick data acquisition.

**Specimen stage:** The new goniometer stage achieves precise specimen movement at nanometer scales.

**Expandability:** The main computer system can integrate a STEM image observation device, an EDS system, and an EELS device, and offer ease of operation. You can also share the obtained information with other PCs using the networking capabilities of the computer system.

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**Spherical aberration correctors for STEM and TEM**

**EM-20900CSS**

**EM-20910CST**

The EM-20900CSS is a spherical aberration (Cs) corrector system for probe-forming (STEM) and EM-20910CST is for image-forming (TEM). Cs correction is a breakthrough technique to improve the limit of resolution for structure observation and chemical analysis. The Cs correctors can be attached to a 200 kV high-resolution microscope with a field emission gun (JEM-2100F, JEM-2200FS). Using these systems, the spherical aberrations of the image and probe-forming lens systems can be set to a desired value. Residual aberrations up to the third order are automatically corrected by the PC controlled system. In the case of an ultra-high-resolution polepiece (URP), the resolutions of 200 kV electron microscope can be enhanced to be 0.1 nm on STEM and 0.12 nm on TEM.

- Automatic aberration correction procedure by computer control
- Cs can be set to a desired value (from –0.5 mm to 0.5 mm in a URP case.)
- Second order aberration coefficients (coma, three-fold astigmatism) can be reduced to < 0.1 µm. Third order aberration coefficients (star aberration and four-fold astigmatism) can be reduced to < 5 µm
Introduction of New Products

TEM Tomograph system

**EM-05500TGP**

TEM Tomograph system performs 3-dimensional (3D) reconstruction from a tilted image series. Software – RECORDER – features auto-focus, automatic position compensation, automatic exposure time estimation, the automatic image recording and the automatic specimen tilting. Using a TEM with an Ω type energy filter, high quality 3D reconstruction can be performed by high contrast zero-loss-energy images. 3D reconstruction using algorithm based on the CT technique is performed after further precise position compensation and determination of a tilt-axis direction of a series of images. Furthermore, a beautiful 3D reconstruction image can be obtained by removal of the artifacts originating in the missing data. You can observe 3D structure intuitively at high speed by visualization of the reconstructed 3D data in a dedicated PC.

- Specimen preparation: Slice section (RuO₄ staining).
- Instrument: JEM-2010 electron microscope & TEM Tomograph system.
- Photographic conditions: -60 deg. to +60 deg. (2.5 deg. steps)

Specimen courtesy of Dr. H. Hasegawa of Kyoto University and Dr. K. Jinnai of Kyoto Institute of Technology.

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**Energy-dispersive x-ray fluorescence spectrometer**

**J SX -3000**

This Energy-Dispersive X-ray Fluorescence Spectrometer (EDXRF) helps you comply with environmental regulations for hazardous substances such as the RoHS or ELV directive in the EU. This system includes an electronically cooled semiconductor detector as standard, making liquid nitrogen unnecessary. Of course, this system carries out the general-purpose analyses.

- Measurement element range: Na to U
- X-ray generator: Rh target, 50 kV, 1 mA (50 W), Fail-safe function provided, Primary X-ray filters: 4 including Open
- Specimen chamber: 300 mm diameter × 50 mm, automatic Open/close
- Detector: Electronically-cooled Si (Li) semiconductor detector, DPP (digital pulse processor) counting method
- Data processing: Windows PC, OS: Windows XP, 17 inch liquid crystal display, color printer
The ultimate ultra high resolution FE SEM  
**JSM-7700F**

The JSM-7700F is developed as an ultra high resolution SEM for observation of nano-structures on the surface of a specimen with high fidelity. The resolution of 0.6 nm is guaranteed at both 5 kV with the aberration correction and 15 kV without the aberration correction. The aberration corrector corrects both spherical and chromatic aberrations. The side entry type specimen stage commonly used on TEMs is extremely stable even at a magnification of \( \times 1,000,000 \). A specimen is kept clean during observation with the completely dry pumping system and the newly developed liquid-nitrogen-free anti-contamination trap.

<table>
<thead>
<tr>
<th>Resolution</th>
<th>0.6 nm (5 kV), 1.0 nm (1 kV)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accelerating voltage</td>
<td>0.5 to 30 kV</td>
</tr>
<tr>
<td>Magnification</td>
<td>( \times 25 ) to 2,000,000</td>
</tr>
<tr>
<td>Specimen size</td>
<td>5 mm ( \times ) 18 mm ( \times ) 8 mm thick, 5 mm ( \times ) 25 mm ( \times ) 4 mm thick</td>
</tr>
<tr>
<td>Specimen movements</td>
<td>X=2.5 mm, Y=24 mm, Z=1 mm</td>
</tr>
<tr>
<td></td>
<td>T=( \pm 45^\circ ) (4 axes: motor controlled)</td>
</tr>
</tbody>
</table>

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Ultra high resolution FE SEM at extreme low voltages  
**JSM-7401F**

The JSM-7401F is the latest high performance field emission scanning electron microscope equipped with the newly developed Gentle Beam and r-filter. The Gentle Beam produces ultra high resolution at low electron energies down to 0.1 kV and enables one to observe true fine surface structures. The r-filter freely mixes secondary electrons and backscattered electrons to observe contrast varying from true secondary images to compositional images. The large 18.1 inch LCD monitor displays a clear high definition live image with 1,280 \( \times \) 1,024 pixels. The fully automated electron optics enables one to achieve the high performance easily. The large specimen chamber designed for a large variety of detectors can accommodate up to a 200 mm diameter specimen.

<table>
<thead>
<tr>
<th>Resolution</th>
<th>1.0 nm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accelerating voltage</td>
<td>0.1 to 30 kV</td>
</tr>
<tr>
<td>Magnification</td>
<td>( \times 25 ) to 1,000,000</td>
</tr>
<tr>
<td>Specimen size</td>
<td>150 mm dia.</td>
</tr>
<tr>
<td>Specimen movements</td>
<td>X=70 mm (motor or manual driven)</td>
</tr>
<tr>
<td></td>
<td>Y=50 mm (motor or manual driven)</td>
</tr>
<tr>
<td></td>
<td>Z=1.5 to 25 mm, T=( \pm 5 ) to 70°</td>
</tr>
<tr>
<td></td>
<td>R=360° (motor driven)</td>
</tr>
</tbody>
</table>
**Introduction of New Products**

**High performance general-purpose SEMs with a large specimen chamber**

**J SM-6480 series**

The JSM-6480 series SEM is a flexible multi-purpose SEM. Multiple users can customize the operation GUI for their efficient operations with optimum performance. The well accepted user friendly GUI has been upgraded to be more compatible with multiple user environment. A unique addition is SmileShot, which sets the SEM for the optimum condition by simply selecting the conditions of a specimen. The large specimen chamber with the five-axis motor controlled specimen stage affording large movements can readily handle a large variety of specimens. The JSM-6480LV, which has the low vacuum mode built-in, can observe and analyze non-conductive specimens without any pre-treatment.

The JSM-6480A and JSM-6480LA are the analytical scanning electron microscopes with a JEOL made EDS elemental analyzer embedded. These compact SEM systems offer comfortable seamless operation from observation to elemental analysis.

- **Resolution**: 3.0 nm (HV mode), 4.0 nm (LV mode)
- **Accelerating voltage**: 0.5 to 30 kV (variable in 56 steps)
- **Magnification**: ×5 to 300,000
- **Specimen size**: 203 mm dia. (max.)
- **Specimen movements**: X=125 mm, Y=100 mm, Z=5 to 80 mm
  \[ T=−10 \text{ to } 90°, \ R=360° \]

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**High performance general-purpose scanning electron microscopes**

**J SM-6380 series**

The JSM-6380 series SEM is a user-friendly high performance general-purpose scanning electron microscope composed of the fully automated high performance electron optics and the newly developed multi-user compatible operation software. The JSM-6380LV, which has the low vacuum mode built-in, can observe and analyze non-conductive specimens without any pre-treatment.

The JSM-6380A and JSM-6380LA are the analytical scanning electron microscopes with a JEOL made EDS elemental analyzer embedded. These compact SEM systems offer comfortable seamless operation from observation to elemental analysis.

- **Resolution**: 3.0 nm (HV mode), 4.0 nm (LV mode)
- **Accelerating voltage**: 0.5 to 30 kV (53 steps)
- **Magnification**: ×5 to 300,000
- **Specimen size**: 150 mm dia. (max.)
- **Specimen movements**: X=80 mm, Y=40 mm, Z=5 to 48 mm
  \[ T=−10 \text{ to } 90°, \ R=360° \]