Transmission Electron Microscope for Atmospheric Aerosol Analysis
Highlighted technologies of JEM-1400

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The JEM-1400, which is equipped with thermionic-emission electron gun, has wide range of accelerating voltages from 40 kV to 120 kV. In the lecture, we introduce features of the instruments (JEM-1400) and its applications. This electron microscope enables us to observe various types of images or patterns such as TEM images, electron diffraction patterns, STEM-BF/DF images and EDS elemental maps with PC-based easy-to-use operation software. The image resolutions in TEM and STEM modes are better than 0.20 nm and 2.0 nm respectively.

The four features of this microscope are shown as follows. The first feature is high-contrast served from the newly developed objective lens, which is effective for morphological observation of low contrast samples in biomedical, clinical, immunological, pharmaceutical, and polymer applications. The high contrast TEM image is essential to determine the morphology. For three-dimensional analysis by the TEM/STEM tomography, the high image contrast is also essential to determine the 3D structure of the samples. The second feature is an advanced graphical user interface (GUI), called “TEM center”. The TEM center framework, developed for an efficient operation, fully utilizing the latest Windows techniques. The screens for routine operations are compactly arranged, enabling beginners to use the microscope easily. For expert operators, the sophisticated GUIs that facilitate direct control of the main elements of the TEM, such as lenses and deflector coils, are provided. The third feature is a high-performance side-entry 5-axis goniometer stage, controlled by the track ball and button switches for quick, intuitive, and seamless operation from low to high magnifications. This stage automatically sets the minimum step for each magnification. The stage has the eucentricity for an X-tilt axis, enabling to obtain a series of the tilt images for TEM/STEM tomography. The fourth feature is many attachments optionally provided such as the STEM, EDS and tomography systems. The elemental mapping can be obtained with the combination of the STEM and the EDS systems. Also, three-dimensional tomogram is obtainable using the TEM/STEM tomography system.