

For Hitachi Model HT7700 120 kV Compact-Digital TEM

High Resolution Lens **EXALENS**

Introducing the High Resolution Objective Lens for Low Accelerating Voltage, High Resolution Analysis of Nanomaterials!!

The HT7700 TEM with a maximum acceleration voltage of 120kV provides a larger field of view at lower magnification in addition to high contrast/high resolution observation by means of Hitachi's unique double-gap objective lens technology.

The new high resolution objective lens achieves a spatial resolution of 0.14 nm at low accelerating voltages with minimal beam damage.



- Point and lattice resolution are improved due to a minimized lens spherical aberration coefficient, enabling better high resolution analytical performance.
- Low damage, high contrast image observation is possible at low acceleration voltages.

Specifications

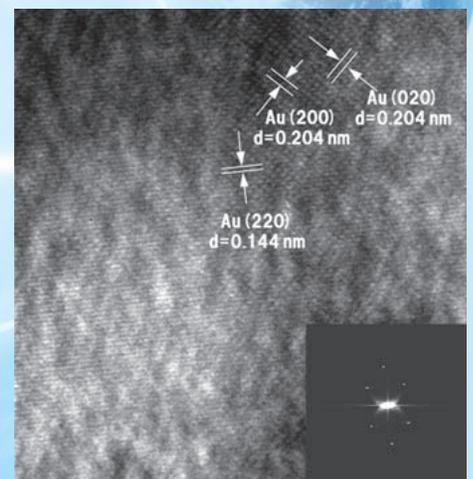
- Electron source: LaB₆ filament
- Resolution: 0.144 nm (Lattice image) at 120 kV, gold single crystal
- Accelerating voltage: 40 ~ 120 kV (100 V step)
- Magnification: Zoom ×200 ~ ×300,000 (HC Mode)
×2,000 ~ ×800,000 (HR Mode)
(Range of SA condition: ×2,000 ~ ×100,000)
Low Mag ×50 ~ ×1,000
- Camera length: 0.2 ~ 8 m HC Diff mode
0.2 ~ 4 m HR Diff mode
- Maximum tilting angle of specimen stage:
±30° (Standard single axis holder)
- STEM function: Option



Outline (with high resolution lens and STEM system)

Resolution test

This figure shows the TEM image of a gold (100) single crystal taken by the tilted illumination technique. At an accelerating voltage of 100 kV, both 0.144 nm lattice constant corresponding to Au (220) and 0.204 nm lattice constant corresponding to Au (200) and Au (020) are clearly seen.

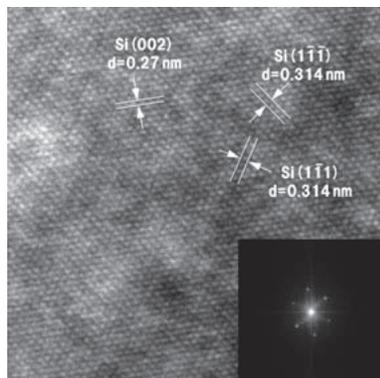


Specimen: Gold single crystal Lens mode: HR mode
Accelerating voltage: 100 kV Magnification: ×600 k

Examples of high-resolution observation

■ Si single crystal

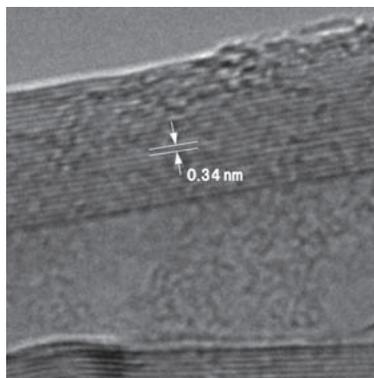
The 0.27 nm spacing corresponding to (002) lattice plane, and the 0.314 nm spacing corresponding to (111) lattice plane can be clearly observed. This result suggests the resolution of 0.27 nm will be possible by on-axis (point) observation by the high-resolution lens of the HT7700.



Specimen: Si single crystal
Accelerating voltage: 120 kV
Lens mode: HR mode
Magnification: $\times 500$ k

■ Multi-walled carbon nanotube (MWCNT)

The 0.34 nm lattice plane of MWCNT can be clearly observed by defocusing the image to increase contrast in this weak phase object. This result suggests that the fine lattice image can be obtained at 120 kV with minimum electron irradiation damage to carbon nanostructures.

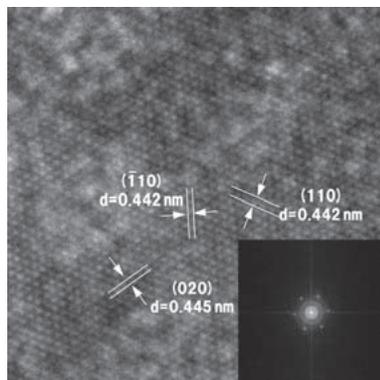


Specimen: MWCNT
Accelerating voltage: 120 kV
Lens mode: HR mode
Magnification: $\times 400$ k

Examples of low accelerating voltage observation

■ Pyrophyllite

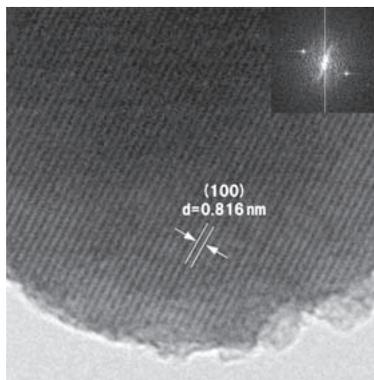
Crystal (110) lattice plane images with a 0.45 nm spacing can be observed in three directions at an accelerating voltage of 60 kV.



Specimen: Pyrophyllite crystal
Accelerating voltage: 60 kV
Lens mode: HR mode
Magnification: $\times 400$ k

■ Hydroxyapatite

Crystal lattice plane with a spacing of 0.816 nm can be observed without damaging the specimen at an accelerating voltage of 40 kV.



Specimen: Hydroxyapatite crystal
Accelerating voltage: 40 kV
Lens mode: HR mode
Magnification: $\times 300$ k

* This brochure is for US distribution only.

Notice: For correct operation, follow the instruction manual when using the instrument.

Specifications in this catalog are subject to change with or without notice, as Hitachi High-Technologies Corporation continues to develop the latest technologies and products for our customers.

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