Focused Ion and Electron Beam System
&
Triple Beam System

HITACHI
Inspire the Next

NX2000
Focused Ion Beam System

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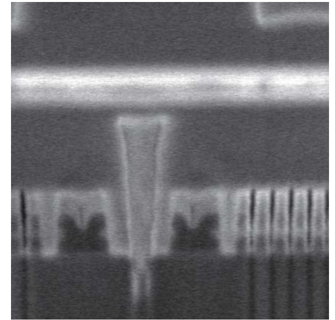
Focused Ion Beam System

Toward the ultimate TEM sample pre

FIB-SEM systems have become an indispensable tool for characterization and analysis
and high performance nano-scale materials. An ever-increasing demand for ultrathin TE
during FIB processing require the best in ion and electron optics technologies.
Hitachi's NX2000 high performance FIB and high resolution SEM system with its unique
and triple beam* technologies, supports high throughput, and high quality TEM sample

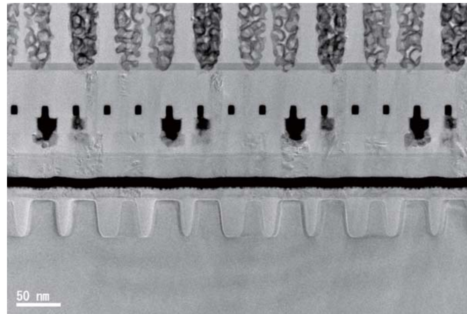
NX2000 Features

High contrast, real-time SEM end point detection allows ultrathin TEM sample preparation of sub 20 nm devices.

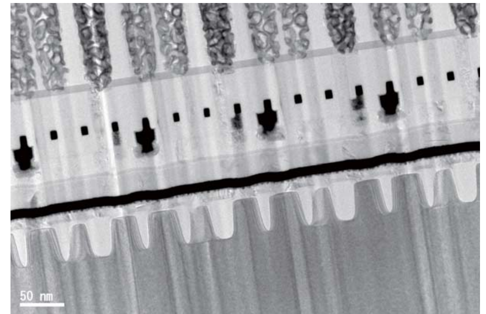


Real-time SEM monitoring during FIB milling
Sample: NAND flash memory
Accelerating voltage: 1 kV
FOV: 0.6 μm

Micro sampling* and high precision positioning mechanism* enable sample orientation control for Anti-Curtaining Effects (ACE function) and uniformly-thick lamellas.

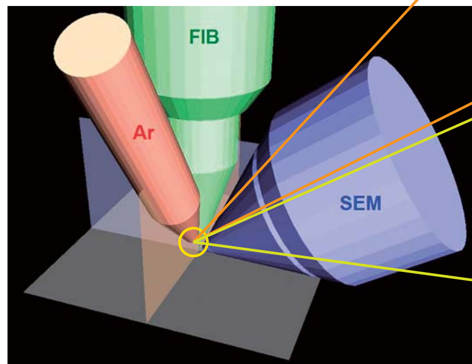


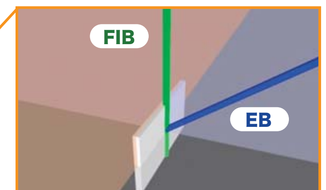
With sample orientation control

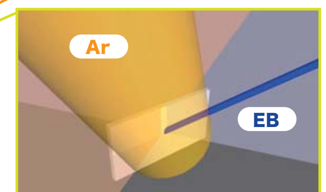


Without sample orientation control

Triple Beam system*
Triple beam configuration for Ga FIB-induced damage reduction.







EB: Electron Beam,
FIB: Focused Ion Beam, Ar: Argon ion beam

paration system

the latest technologies
lamellas without artifacts

mple orientation control*
paration for cutting edge applications.

NX2000 Key technologies

High contrast, high resolution SEM
The Cold cathode Field Emission (CFE) source is ideal for high resolution imaging with a small source size and energy spread

Real-time SEM monitoring during FIB and Ar/Xe beam* milling
for accurate end point detection without changing conditions

Patented Micro-sampling technology*
*enhanced 4-axis probe with rotation mechanism**

High precision positioning mechanism*
for unique sample orientation control to allow various beam geometries

Large chamber and 200 mm stage
to accommodate large samples such as 8-inch wafer

Low voltage FIB and Ar/Xe ion beam column*
Ar/Xe ion beam 3rd column for Ga FIB-induced damage reduction

Multi-gas injection system*
for deposition of various materials and enhanced etching applications

Automatic TEM sample preparation function*
Software for automating material processing of multiple TEM samples

HITACHI patents:
USP6,118,122, USP6,538,254, USP6,822,245, USP6,828,566, USP7,138,628, USP7,345,289, USP7,397,050, USP7,397,051, USP7,442,942, USP7,525,108, USP7,550,750, USP7,718,981, USP8,198,603, USP8,569,719, USP8,703,247, and other patents, as of July, 2014.

* Option

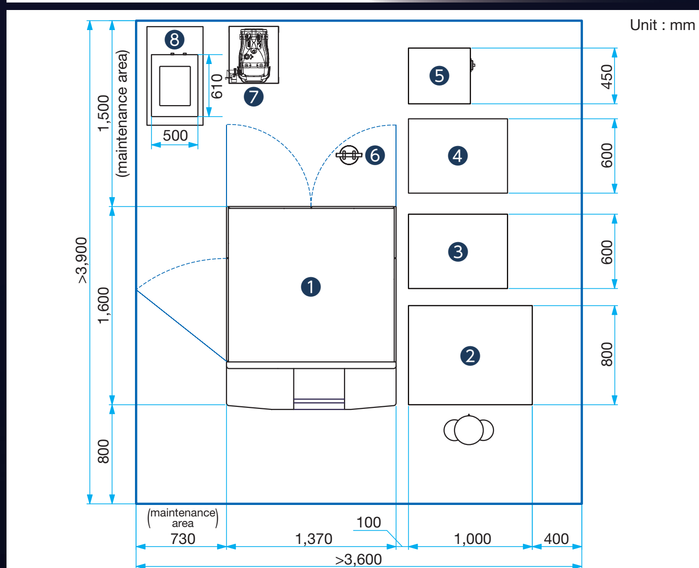
Specifications

NX2000	
FIB column	
Resolution (SIM)	4 nm @ 30 kV, 60 nm @ 2 kV
Accelerating voltage	0.5 kV - 30 kV
Beam current	0.05 pA - 100 nA
Max. beam current density	54 A/cm^2
Aperture	Automated - 15 positions
Min. dwell time	10 ns
FE-SEM column	
Resolution	2.8 nm @ 5 kV, 3.5 nm @ 1 kV
Accelerating voltage	0.5 kV - 30 kV
Electron source	Cold cathode field emission source
Real-time monitoring	Optics enabled for live fabrication
Detector	
Standard detector	Upper/Lower SED & BSED
Stage	
X	0 - 205 mm
Y	0 - 205 mm
Z	0 - 10 mm
θ	0 - 360° continuous
τ	–5 - 60°

Option

- Ar/Xe ion 3rd column
- Micro-sampling System
- Multi-gas injection system
  - Multi-gas injection system
  - Tungsten deposition gas
  - Platinum deposition gas
  - Insulator deposition gas
  - Xenon difluoride gas
  - Organic material etching gas
- Double tilt system
- Swing function (for Ar/Xe ion 3rd column)
- TEM sample preparation wizard
- Automatic TEM sample preparation software
- CAD navigation software
- Linkage software with defect inspection instruments
- Air protection holder
- Cooling holder
- Plasma cleaner
- EDS (Energy Dispersive x-ray Spectroscopy) system

Layout



	Unit	Width x length x height (mm)	Weight (kg)
1	Main unit	1,370 x 1,600 x 1,900	2,035
2	Operation table	1,000 x 800 x 720	60
3	SEM control cabinet	600 x 800 x 2,000	500
4	FIB control cabinet	600 x 800 x 2,000	485
5	Transformer	450 x 500 x 450	70
6	Weight	150 x 150 x 122	23
7	Scroll dry pump	600 x 650 x 470	35
8	Chiller (recommended model)	500 x 610 x 377	45

Utilities

Temperature	Set value	22˚C±3˚C
	Tolerance	Set value ±1˚C
	Fluctuation	0.5˚C/h or less
Humidity	Tolerance	35 - 60%, no condensation
Power	Single phase AC200/208/220/230 V ±10% 30 A (50/60 Hz)	
Grounding	D-class	100 Ω or less
Cooling water	Flow	0.7 L/min or less
	Pressure	50 - 100 kPa
	Temperature	15 - 25˚C
	Temperature fluctuation	±0.5˚C or less/10 min
N^2 gas (for gas leak)	Purity	99.95% or higher
	Pressure	0.5 - 0.7 MPa
Air (for valve control)	Pressure	0.5 - 0.7 MPa

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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