

# LVEM 25E

Compact Low Voltage Electron Microscope

All-in-One EM



# INTRODUCING THE LVEM 25E



## Five imaging modes in one instrument

- Equipped with TEM, STEM, SEM, EDS and ED modes
- Easily switch between imaging modes via intuitive software
- Bright and dark field measurements in both TEM and STEM modes
- SEM mode (BSE) for surface measurements
- Energy Dispersive Spectroscopy (EDS) for elemental analysis
- Electron Diffraction (ED) for understanding crystal structure

## Fully integrated and portable design

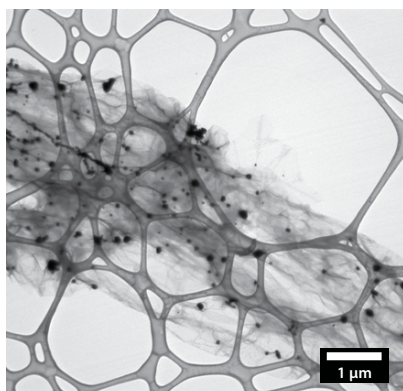
- Extremely compact, space-saving and portable design
- Single-plug installation in nearly any laboratory environment
- No special facility requirements (no cooling, power or anti-vibration isolation needed)

## High contrast and resolution for standard samples

- Unmatched contrast of biologic and light material samples
- Meaningful results with reduced staining
- Image resolution as good as 1.0 nm
- Designed for conventionally prepared samples
- Super-fast sample exchange

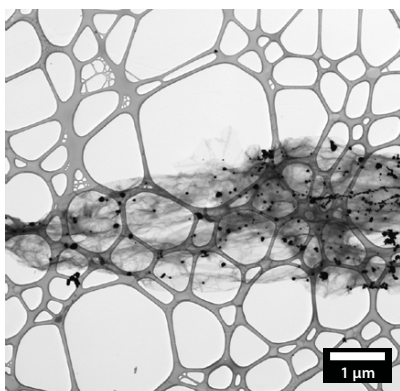
# YOUR WAY TO ELECTRON MICROSCOPY

Equipped with TEM, STEM, SEM, EDS and ED modes, the LVEM 25E provides users with a unique option to obtain multiple data results from one sample – you can easily switch between the imaging modes using the intuitive LVEM software.



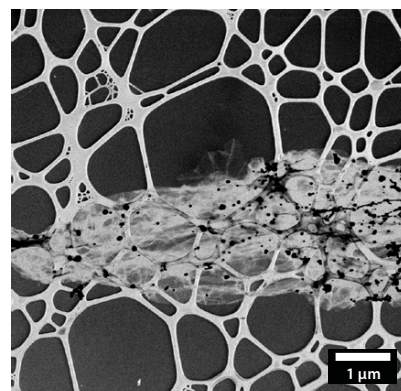
## TEM

Imaging in the 25 kV TEM mode provides high frame rate, live-imaging for well contrasted size, shape and structural measurements.



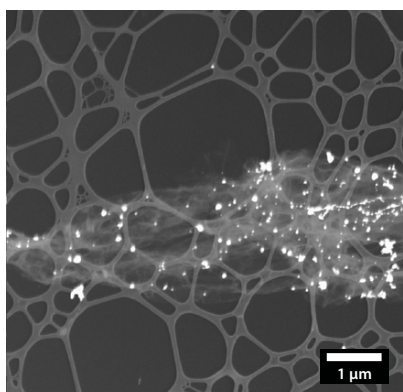
## STEM

Imaging at lower accelerating voltages with the 10 kV and 15 kV STEM modes provides even higher contrast levels and allows for analysing thicker samples.



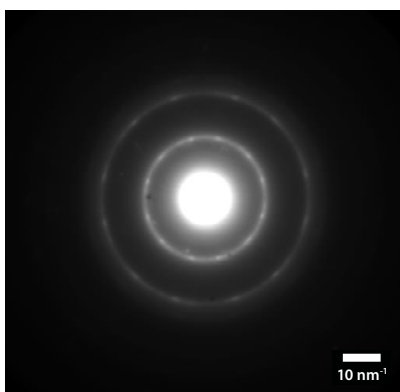
## Dark Field

Both TEM and STEM dark field modes make imaging samples easier on challenging backgrounds, crystalline planes, dislocations, DNA, etc.



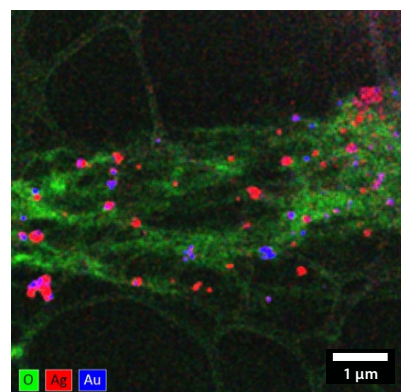
## SEM

The SEM mode (BSE) offers analysis of sample surfaces for understanding surface shape and texture.



## ED

Electron diffraction allows for structural characterization of crystalline materials.

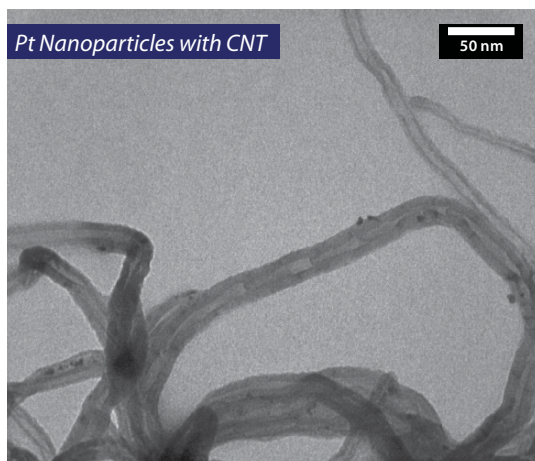


## EDS

The EDS mode allows for analysing the chemical composition of the samples and creating element composition maps which can be overlaid with the STEM and SEM data.

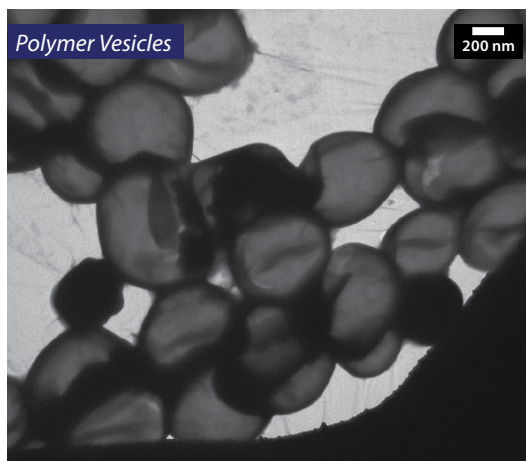
# MATERIAL SCIENCE APPLICATIONS

The all-in-one LVEM 25E provides its users with a never-before-seen level of imaging versatility. For users in materials science, this device provides the possibility to not only measure internal and external structures, but also to analyse the chemical composition of the sample, all in a single device. The advanced software assists the user by automatically setting column alignments and aperture positions. A super-fast sample exchange further enhances imaging throughput.



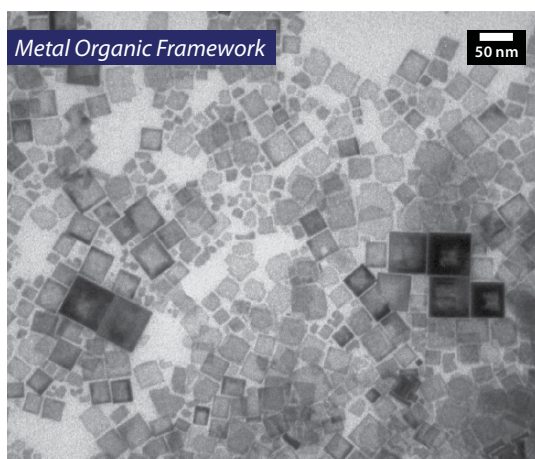
## Nanomaterials

Capture shape, structure and size distributions of nanoparticles through high contrast TEM and SEM measurements to reveal detailed nanoscale features.



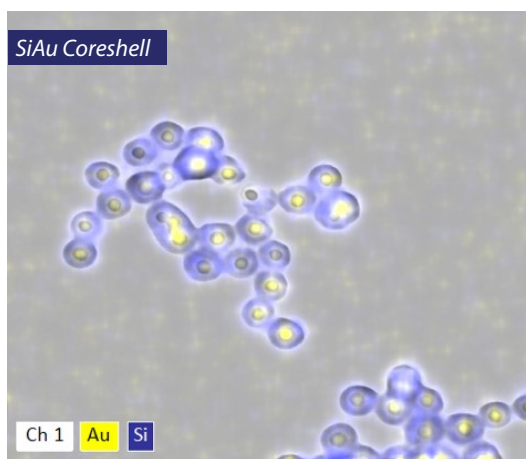
## Polymers

Understand sample morphology and detect imperfections in the crystalline structure of polymeric materials using high contrast TEM measurements and detailed ED data.



## Chemistry

Quickly understand the quality and purity of your samples, or the effectiveness of a new synthesis protocol, using high-contrast TEM and SEM images and EDS data.

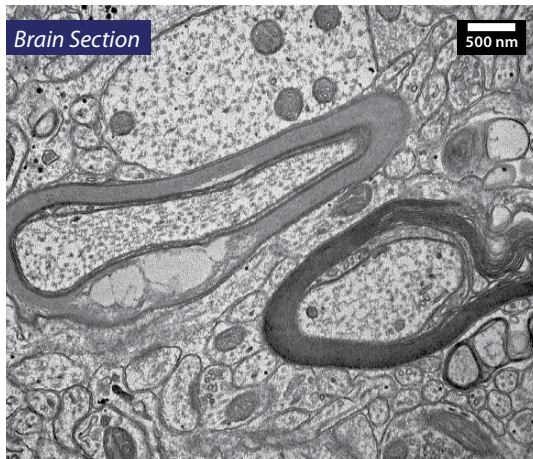


## Combined Materials

Characterize mixtures of materials for mixture ratio, sample purity, presence of contaminants and other aspects of your samples.

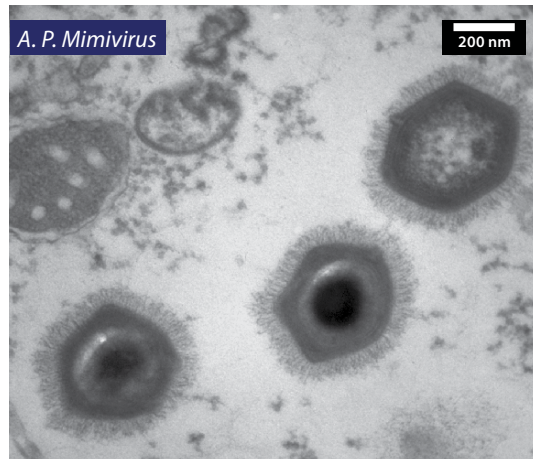
# LIFE SCIENCE APPLICATIONS

The LVEM 25E is the ideal imaging device for applications in life sciences. Equipped with five imaging and analysis modes, it can push research to the next level. Super-fast sample exchange and enhanced automation make the LVEM 25E a practical and easy-to-use tool for routine imaging applications. The LVEM 25E provides well-contrasted and highly detailed images from samples prepared with standard preparation protocols and provides the option to obtain the same level of detail with reduced staining.



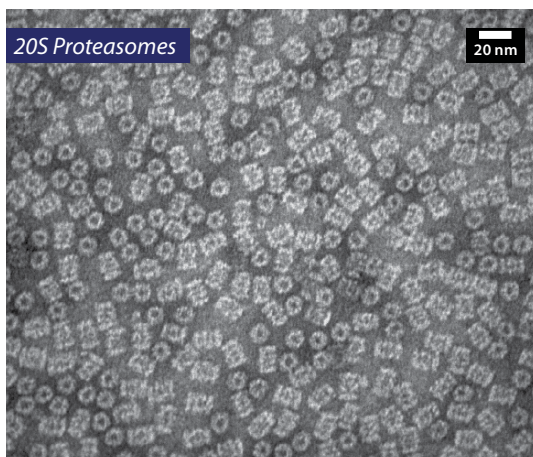
## Pathology

Capture high-throughput images of thin sections prepared using standard protocols or analyse structures typically hidden with stain using reduced staining protocols. Combine TEM with SEM measurements to check basic surface characteristics and sample quality.



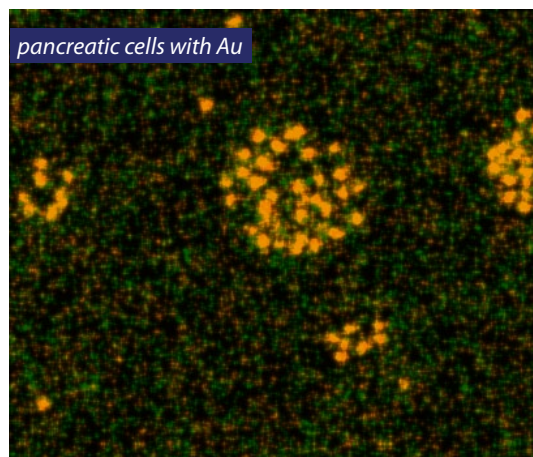
## Virology

Quickly and reliably measure critical details about the quantity, size, shape, and capsid structures of even the smallest of viruses. Use the STEM mode to analyse the internal structures of larger viruses.



## Biochemistry

Capture high-contrast negatively stained images of various biomaterials – such as proteins – with reduced stain to study size, shape, and structure. Or eliminate the stain completely to learn about these materials in a completely new way.



## Immunology and Oncology

Facilitate the study of thin-sectioned immunolabeled biological samples with the flexibility of imaging unstained, but tagged, thin sections using TEM and STEM imaging modes combined with EDS data.

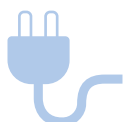
# KEY TECHNICAL FEATURES



## Integrated Design

### Compact and portable

The completely self-contained design maximizes the choice of installation locations, and for the first time, enables a truly effortless relocation of the electron microscope.



## No Special Facilities

### Worry-free installation

The LVEM 25E can be readily installed in most spaces without the need for special electrical or plumbing considerations. Simply plug it into a standard electrical outlet and put it into operation in just a few hours.



## Permanent Magnet Lenses

### No cooling required

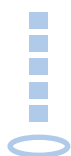
The unique LVEM platform employs permanent magnet lenses and makes the device compact, robust and easy to use while eliminating the need for any cooling.



## Fast and Easy Vacuum Recovery

### Automated soft bake and gun conditioning

The LVEM 25E reduces downtime should there be a loss of vacuum. With the automatic soft bake and gun conditioning functions, recovering the vacuum is fast and does not require a service visit.



## Direct Beam Measurement

### Low dose quantification

This LVEM 25E function enables the users to measure sample irradiation.



## Automated Features

### Optimal imaging conditions

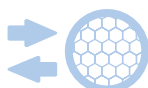
Automated correction and control of beam alignment, coarse focus, objective lens astigmatism and aperture position, minimizes the need for the operator to manually correct them. This means the LVEM 25E is always ready to image with optimal performance.



## Two-stage magnification

### Robust & Powerful

In a unique LVEM design, light optics provide further magnification of the electron beam image, providing the users with stable and reliable performance.



## Rapid sample exchange

### High-throughput imaging

A redesigned vacuum system, employing an integrated and maintenance free turbomolecular pump, combined with vibration free ion getter pumps, allows for a super-fast sample exchange time and produces an ultra-high vacuum imaging environment, free from contamination.



## Field Emission Gun

### Highest contrast

A 25 kV Schottky type FEG with very high brightness and spatial coherency allows for strong interactions between the emitted electrons and the sample. This is what provides the LVEM 25E with uniquely high contrast.



## Assisted sample exchange

### Safety for less experienced users

An optional sample exchange wizard guides users through the sample insertion and removal sequence step by step, making the LVEM 25E operation safe even for new or occasional users.

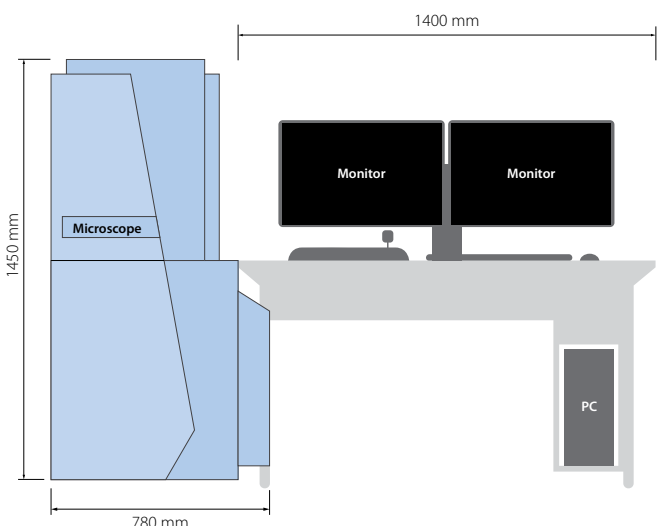
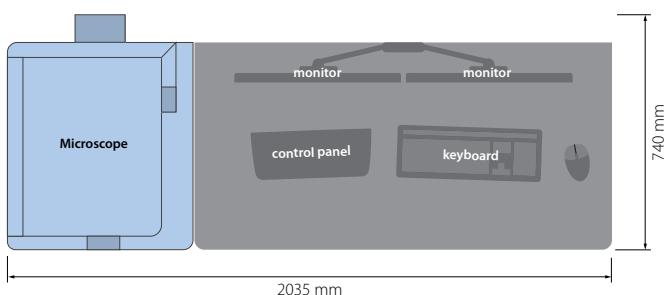
# SPECIFICATIONS

| OPERATION                        |                              |             |
|----------------------------------|------------------------------|-------------|
| Electron gun                     | Schottky field emission gun  |             |
| Specimen size                    | Standard Ø 3.05 mm TEM grids |             |
| Objective lens                   | Magnetostatic                |             |
| Projective lens                  | Electrostatic                |             |
| Specimen movement                | x, y: ± 1 mm                 | z: ± 0.5 mm |
| Tilt holder                      | ± 20°                        |             |
| IMAGING MODES                    |                              |             |
| TEM                              |                              |             |
| Nominal accelerating voltage     | 25 kV                        |             |
| Resolution                       | 1.0 nm                       |             |
| Total magnification*             | 3,400 – 1,300,000×           |             |
| Magnification in Low mag regime* | 1,500×                       |             |
| Field of view                    | 100 – 0.25 µm                |             |
| Field of view in Low mag regime  | 225 µm                       |             |
| TEM IMAGE CAPTURE                |                              |             |
| Camera                           | sCMOS                        |             |
| Sensor size                      | 2,048 × 2,048 pixels         |             |
| Digitalization                   | 16-bits                      |             |
| ELECTRON DIFFRACTION             |                              |             |
| Probe size                       | 500 – 8,000 nm               |             |
| Camera length (binning 2x2)      | 2,000 – 5,000 pixels         |             |
| Camera constant (binning 2x2)    | 17 – 40 nm pixels            |             |
| STEM                             |                              |             |
|                                  | STEM 10                      | STEM 15     |
| Nominal accelerating voltage     | 10 kV                        | 15 kV       |
| Resolution                       | 1.0 nm                       | 1.3 nm      |
| Maximum magnification            | 940,000×                     | 750,000×    |
| Maximum field of view            | 105 µm                       | 80 µm       |
| STEM IMAGE CAPTURE               |                              |             |
| up to 2,048 × 2,048 pxls/8 bits  |                              |             |
| SEM (BSE DETECTOR)               |                              | SEM 15      |
| Nominal accelerating voltage     |                              | 15 kV       |
| Resolution                       |                              | 4 nm        |
| Maximum magnification            |                              | 750,000×    |
| Maximum field of view            |                              | 80 µm       |
| SEM IMAGE CAPTURE                |                              |             |
| Up to 2,048 × 2,048 pxls/8 bits  |                              |             |

| EDS                                  |                              |
|--------------------------------------|------------------------------|
| Detector type                        | Silicon Drift Detector (SDD) |
| Detector active area                 | 30 mm <sup>2</sup>           |
| X-Ray Window                         | Windowless                   |
| Energy Resolution                    | Mn Ka ≤ 129 eV               |
| Maximum throughput                   | 130 000 cps                  |
| Hardware integration                 | Fully embedded               |
| Software                             | Esprit 2.3                   |
| VACUUM                               |                              |
| AIRLOCK SYSTEM                       |                              |
| Diaphragm and turbomolecular pump    | 10 <sup>-5</sup> mbar        |
| OBJECT SPACE                         |                              |
| Ion getter pump                      | 10 <sup>-8</sup> mbar        |
| ELECTRON GUN                         |                              |
| Ion getter pump                      | 10 <sup>-9</sup> mbar        |
| MAINS CONNECTION & POWER CONSUMPTION |                              |
| Standby / Operation / Maximum        | 60 VA / 410 VA / 600 VA      |
| Voltage / Frequency                  | 100 – 240 V / 50 – 60 Hz     |
| DIMENSIONS AND WEIGHT                |                              |
| MICROSCOPE                           |                              |
| Weight                               | 220 kg                       |
| Dimensions (w × d × h)               | 780 × 740 × 1450 mm          |
| DIAPHRAGM PUMP                       |                              |
| Weight                               | 3 kg                         |
| Dimensions (w × d × h)               | 300 × 160 × 200 mm           |
| TABLE                                |                              |
| Weight                               | 50 kg                        |
| Dimensions (w × d × h)               | 1400 × 700 × 760 mm          |
| MAINS CONNECTION                     |                              |
| Voltage / Frequency                  | 100 – 240 V / 50 – 60 Hz     |
| INSTALLATION BENEFITS                |                              |
| No cooling water needed              |                              |
| Only one single phase plug needed    |                              |
| Portable design                      |                              |

\*valid for image on display at binning 2×2

## LVEM 25E Installation Layout



# CONTACTS

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## LVEM Distribution

### Europe

DELONG INSTRUMENTS a.s.  
[www.delong.cz](http://www.delong.cz)

**Germany, Austria & Switzerland**  
Physical Electronics GmbH  
[www.phi-gmbh.eu](http://www.phi-gmbh.eu)

**Poland**  
PIK Instruments  
[www.pik-instruments.pl](http://www.pik-instruments.pl)

**Hungary, Slovenia, Croatia**  
Image Science  
[imagescience.hu](http://imagescience.hu)

**Romania**  
NanoTeam  
[www.nanoteam.ro](http://www.nanoteam.ro)

**Republic of Moldova**  
Lokmera  
[www.lokmera.md](http://www.lokmera.md)

**France**  
Cordouan Technologies  
[www.cordouan-tech.com](http://www.cordouan-tech.com)

**Italy**  
Media System Lab  
[www.m-s.it](http://www.m-s.it)

**Spain and Portugal**  
Quark Iberica  
[www.quark-iberica.site](http://www.quark-iberica.site)

### World

DeLong America  
[delongamerica.com](http://delongamerica.com)

LVEMs are supported globally by sales and service offices in local markets. Please contact us directly for any questions you have or to be referred to your local distributor.

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... your way to electron microscopy