

# Talos L120C for Materials Science

## The new high-contrast, 120 kV, multi-discipline TEM

As the successor to the Tecnai Spirit, the Talos L120C TEM is the newest 120kV transmission and scanning transmission electron microscope (STEM) for high-contrast, high-resolution imaging and analysis in Materials Science applications.

The Thermo Scientific™ Talos L120C™ TEM is a 20-120 kV thermionic (scanning) transmission electron microscope uniquely designed for performance and productivity across a wide range of samples and applications, such as 2D and 3D imaging of cells, cell organelles, asbestos, polymers, and soft materials, both at ambient and cryogenic temperatures.

With its optional, motorized, retractable cryo-box and low-dose technique, the imaging quality of beam-sensitive materials is taken to the next level. Additionally, a side-entry retractable Energy Dispersive Spectroscopy (EDS) detector can be added to the configuration to enable chemical analysis.

The large C-Twin pole piece gap—giving highest flexibility in applications—combined with a reproducibly performing electron column opens new opportunities for high-resolution 3D characterization, *in situ* dynamic observations, and diffraction applications with a special emphasis on high-contrast imaging and cryo-TEM. The Talos L120C TEM is equipped with the fast 4k × 4k Ceta™ 16M camera, which provides large field-of-view and fast imaging with high sensitivity on a 64-bit platform.

Designed for multi-user and multi-discipline environments and equipped with a user interface that is immediately familiar since it is shared across all Thermo Scientific TEM platforms, the Talos L120C TEM is also ideal for novice users. All TEM daily tunings have been automated to provide the best and most reproducible setup. This automation eases the learning curve for novice operators, reduces tensions in a multi-user environment, and improves time-to-data for the experienced operator.

### Key benefits

**Superior images.** High-contrast, high-quality TEM and S/TEM imaging with simultaneous, multiple signal detection up to four-channel integration STEM detectors

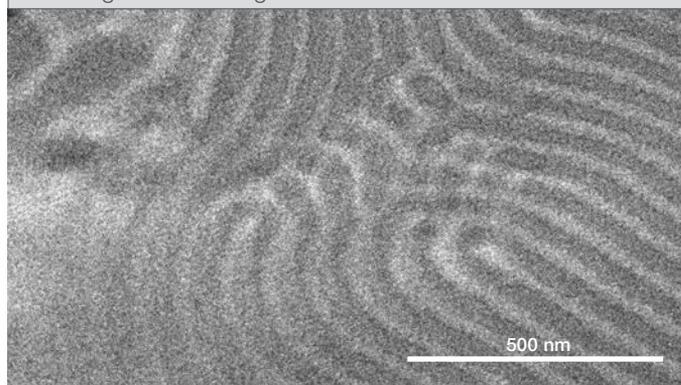
**Chemical composition data.** Flexible EDS analysis reveals chemical information

**Space for more.** Add tomography or *in situ* sample holders. Large analytical pole piece gap, 180° stage tilt range, and large z-range

**Improved productivity and reproducibility.** Ultra-stable column and remote operation with SmartCam and constant power objective lenses for quick mode and HT switches. Fast, easy switching for multi-user environments

**Auto-alignments.** All daily TEM tunings, such as focus, eucentric height, center beam shift, center condenser aperture, and rotation center are automated

**4k × 4K Ceta CMOS camera.** Large field-of-view enables live digital zooming with high sensitivity and high speed over the entire high-tension range



TEM at 120kV. Block copolymer. TEM image showing morphology of an annealed polymer film made of the block copolymer Polystyrene-*b*-Poly (methyl methacrylate) showing a lamellar structure with PS regions (light contrast) and PMMA layers (dark contrast). *Sample courtesy of Kevin Jack and Idriss Blakey, The University of Queensland.*



### Enhanced productivity

To further enhance productivity, especially in multi-user, multi-material environments, the constant-power objective lenses and low-hysteresis design allow for straightforward reproducible mode and high-tension switches. The Talos L120C TEM also features educational online help. Simply pressing F1 with the mouse hovering over a control panel quickly opens relevant information.

Thermo Scientific MAPS™ Software enables intuitive image-based navigation over a whole sample and easy correlation of results across imaging platforms. In order to retrieve large area imaging at high resolution MAPS Software automatically acquires and stitches the images to document the entire area of interest with exceptional quality. MAPS Software can be used across-tools and in-a-tool. It supports image import, overlay and alignment from other microscopes for example an SEM or Light Microscope. This enables for instance digital zooming with the small mouse wheel from correlated low magnification TEM and/or SEM to HRTEM, which provides valuable contextual information.

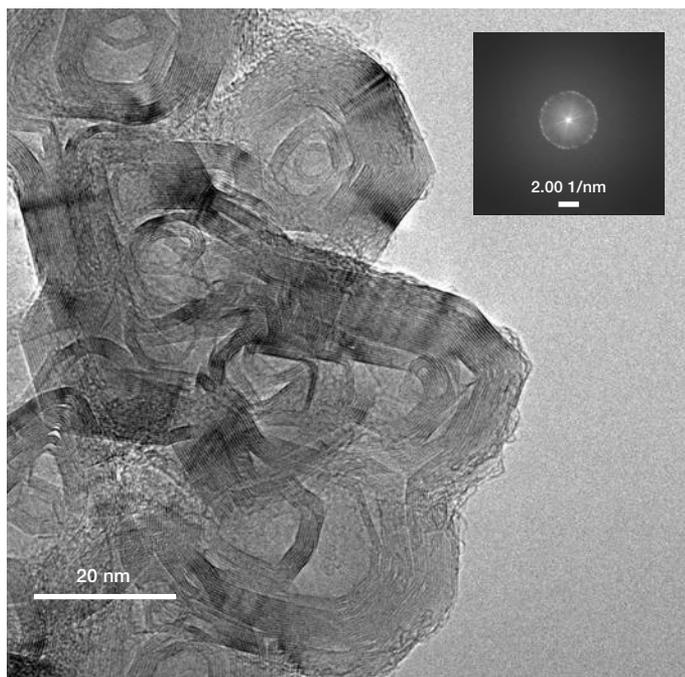
### Installation requirements

Small footprint. Please contact your local Thermo Fisher Scientific Sales representative for a complete pre-installation requirements document.

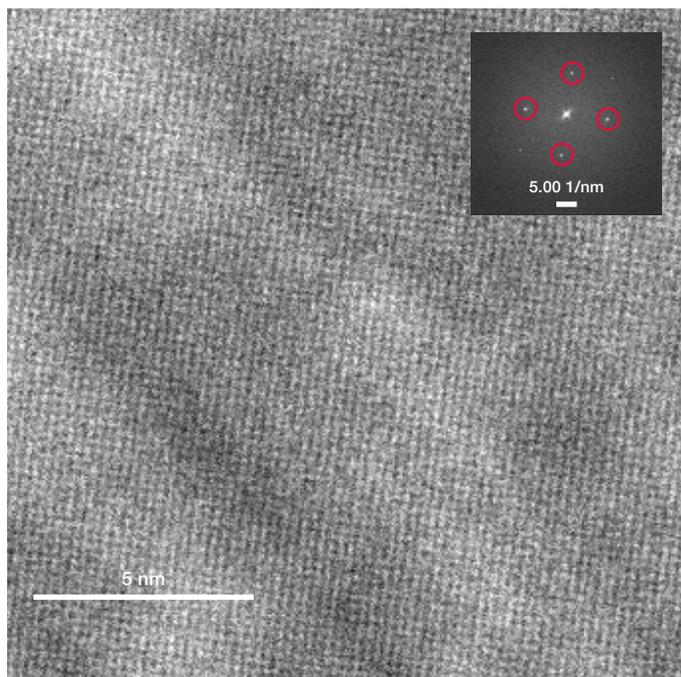
### Key Specifications

TEM line resolution (nm) axial / untilted illumination	≤ 0.204
TEM magnification range	25–650k×
TEM magnification range with camera image enhancement	35–910k×
Diffraction mode camera length range [m]	0.0205–8.1
Maximum full convergence angle for LACBED [mrad]	≥ 200
Alpha tilt angle (with standard holders)	-90° to +90°
STEM HAADF resolution with LaB6 (nm)	≤ 1.0 nm
STEM magnification range	200–2.2M×
EDS	Side-entry, retractable Must be retracted for cryo work
Cryo-box	Side-entry, motorized auto retractable Must be retracted for EDS work

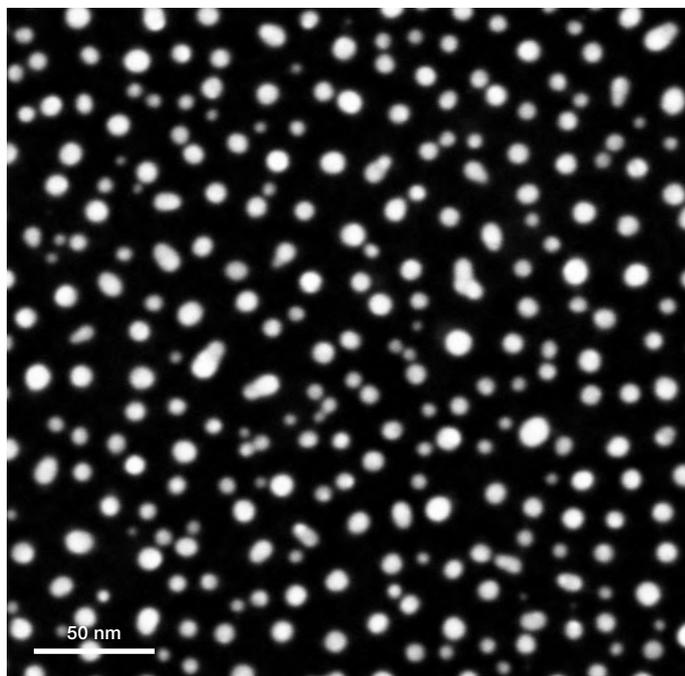
## Imaging on a Variety of Materials



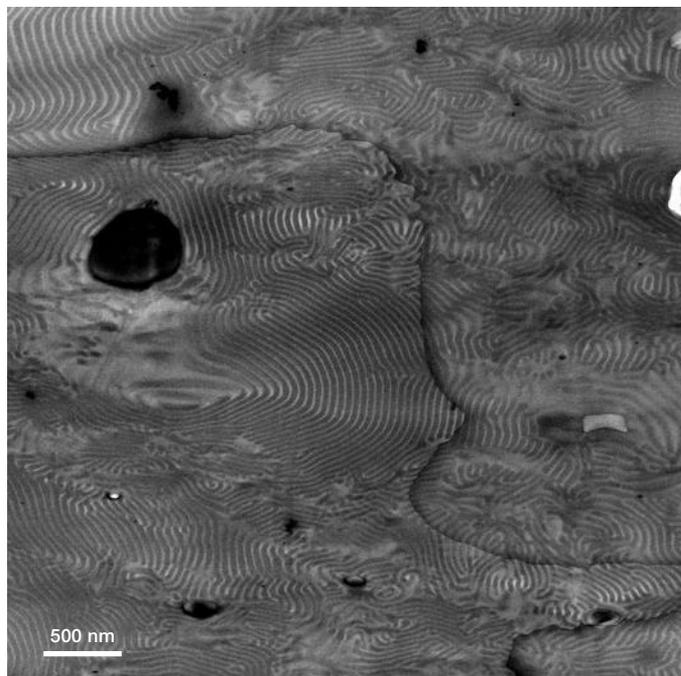
High-resolution TEM. Graphitized carbon and FFT.



High-resolution TEM. HRTEM Gold [100] and FFT.



High-resolution STEM. Gold particles on Si<sub>3</sub>N<sub>4</sub>. Resolution < 1.0 nm.



TEM at 80kV. Block copolymer. Low-voltage TEM image showing morphology of an annealed polymer film made of the block copolymer Polystyrene-b-Poly (methyl methacrylate) showing a lamellar structure with PS regions (light contrast) and PMMA layers (dark contrast). *Sample courtesy of Kevin Jack and Idriss Blakey, The University of Queensland.*

## Full specifications

TEM	
Line resolution	≤ 0.204 nm
High tension (min steps)	20 – 120 kV
Magnification range	25x – 650kx
Magnification range with camera enhancement option	35x – 910kx
SA camera length (SAD)	0.0205 – 8.1 m

Operating System	
Controller	Windows® 7
User interface	User-defined
Customer user levels	3
Scripting facilities	Yes
Remote controllable	Yes

Vacuum System	
Filament lifetime: Tungsten/LaB6:	100/1000 hours
Wehnelt cylinder exchange time	< 5 minutes
Air lock pumping	Oil-free
Cold trap	Standard
Long-duration dewar	Optional; at least 4 days stand-time (between refills)

STEM Imaging	
STEM HAADF resolution (with LaB6 source)	≤ 1.0 nm
STEM high-magnification scanning mode	4.3k – 2.2Mx
STEM low-magnification scanning mode	200 – 25.5kx
Detectors	HAADF, on-axis BF/DF

Specimen Manipulation	
Alpha tilt angle	± 90° (standard holders)
X, Y minimal step size	≤ 4 nm
Z Movement total travel	± 0.375 mm
Specimen drift	≤ 1.0 nm/min

CETA 16 MPix Camera	
Sensor	4,096 × 4,096, 14 mu pixel CMOS
Frame rate	4k × 4k: 1 fps 2k × 2k: 8 fps 1k × 1k: 18 fps 512 × 512: 25 fps
Mounting position	On-axis, bottom-mounted, retractable
Computer platform	Windows 7, 64-bit

Cryo Accessories Available	
Automated cryo box	Optional; motorized
Sample analysis	Low-dose supported
Ice growth rate	< 0.7nm / hr with cooled cryo box inserted
Alpha tilt angle	± 70° with cryo-holder

Contact your account manager or visit [thermofisher.com](http://thermofisher.com) to learn more about the Talos L120C TEM and how we can help enhance your research.

Find out more at [thermofisher.com/EM-Sales](http://thermofisher.com/EM-Sales)

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