

K975X Turbopumped thermal high vacuum evaporator for TEM, SEM and thin film applications

Key features

- Menu-driven automatic operation
- Unique 'anti-stick' carbon rod evaporation gun
- Metal evaporation source
- Specimens up to 140 mm² or 200 mm diameter
- Wide selection of 'add-on' options
- Rack-out drawer specimen loading
- Restricted or full vent control

Metal and carbon coating sources

The K975X is fitted with a carbon rod gun and metal filament/boat source which can also be used for cleaning TEM and SEM apertures. An optional sputtering source is available.

Work chamber

The borosilicate glass work chamber is 250 mm diameter x 300 mm and mounted on an aluminium support collar. A tough chamber implosion guard is included as standard. The chamber can accommodate specimens up to 200 mm in diameter. A unique rack-out specimen loading system gives the user easy specimen access and the hinged lid assembly makes other areas of the vacuum chamber readily accessible.

Menu-driven control

The menu-driven microcontroller allows the user access to a range of options, but readily 'defaults' to optimum operating conditions, allowing both fully-automatic and manual override as required.

Turbomolecular pumping and venting

The K975X uses a modern 100 l/sec turbomolecular pump backed up by an external rotary vacuum pump (not included, see EK3175) with the complete pumping sequence being under fully-automatic control. The vacuum pump-down sequence is automatically controlled by the system microprocessor. Vacuum measurement is by a combined pirani/penning gauge and is displayed digitally. Process gases (nitrogen for venting – if fitted – and argon for the optional EK4175 sputtering attachment) are automatically controlled and can be programmed for use during coating sequences. The vent valve has an adjustable restrictor and programmable vent time to prevent disturbing specimens due to the inrush of gas at the end of the cycle. A very useful feature of the K975X is 'vacuum shut-down', which allows the process chamber to remain under vacuum when not in use. This helps to maintain a high level of system cleanliness and vacuum performance.



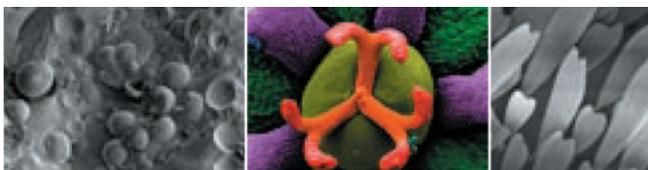
Specimen stages

The K975X is fitted with an 80 mm flat stage as standard, but this may be exchanged for optional holders, such as a 3 mm grid holder, low-angle shadowing attachment and a rotary planetary stage (see Options and Accessories). Specimen holders are supplied with a bayonet fixing for quick exchange.

The rotary stage is mounted on a sliding access port on the side of the chamber. This allows the user to exchange specimens quickly without having to remove the glass chamber and disturb any coating set-up. The standard flat stage may be tilted. For rotary shadowing techniques, the standard stage can be tilted from 0° to ±180°.

Chamber base plate and evaporation power supplies

The K975X is fitted with a 0–100 A evaporation power supply with base plate terminals for carbon rod evaporation (14 V/100 A), evaporation from a metal filament (15 V/35 A), carbon string evaporation (25 V/35 A) and a terminal rated at 5 V/35 A for TEM and SEM aperture cleaning using a molybdenum (Mo) boat. A wide range of add-on options is available – see options and accessories.



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Overview

The K975X is a compact, bench-mounted, multiple application thermal evaporator for vacuum deposition of thin layers of carbon and metals. It is ideal for a wide range of techniques, including the manufacture of carbon support films and replicas for TEM, plus metal and carbon thin film applications.

The K975X is available with a wide range of optional add-ons, including low-angle shadowing and sequential layer coating using dual-source evaporation (an additional metal evaporation source is needed). A sputtering attachment and film thickness monitor are also available. The system is fitted with an 80 mm diameter flat rotation specimen stage, but this can be exchanged for optional stages and holders to meet differing user requirements.

The K975X vacuum system is under fully automatic or manual control and uses a 100 l/sec turbo molecular pump to ensure rapid pump down and clean vacuum conditions.

K975S Carbon evaporator for 200 mm wafers

The K975S is similar to the K975X but designed to coat an 200 mm wafer or similarly large specimen with carbon. The carbon rod evaporation source is directly mounted to the vacuum chamber top plate, allowing easy access to the carbon gun and giving the optimal source to specimen distance required for large diameter specimens. Unlike the K975X, the K975S is not fitted with a metal evaporation source and associated base plate mounting pillars and also has a larger specimen access door.

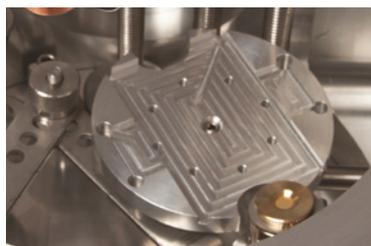


Carbon rod evaporation source. The height of evaporation sources can be adjusted using threaded terminal pillars

Rotary planetary specimen stage mounted on the sliding access drawer



Specimen stage in position. The quartz crystal and holder of the optional film thickness monitor (FTM) locate into a recess in the stage and can be angled towards the evaporation source



"Anti-stick" carbon evaporator source, designed to accept 6.15 mm diameter carbon rods. Four springs maintain an even pressure during the evaporation process and ensure even, reproducible deposition



The standard metal source can be used to evaporate a range of metals from a suitable tungsten filament or boat. The terminals can also be used to evaporate carbon fibre. An adjustable source shield is fitted to help maintain the cleanliness of the system

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Options and accessories

- AL410414 holder for TEM grids
- 10983 Film thickness monitor attachment with controller mounted in the K975X consol. Includes monitor and stage complete with quartz crystal holder and quartz crystal
- EK4117 additional metal evaporation source for filament/boat evaporation and aperture cleaning
- EK4175 sputtering module, including chromium (Cr) target (other targets available as options, see Q150T for full list)
- EK4205 rotating specimen stage (planetary style) with externally adjustable tilt angle
- EK4160 low-angle shadowing. Ideal for flat TEM specimens, such as DNA proteins and virus particles
- AL410123 Manually-operated source shutter

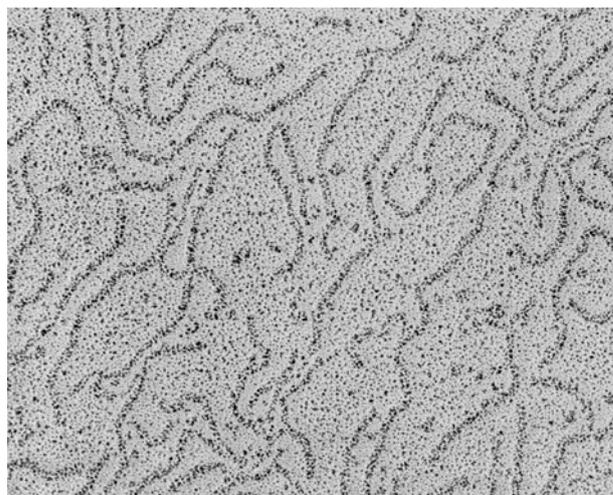
Examples of low angle shadowing using carbon and platinum evaporation:



Pseudomonas fluorescens



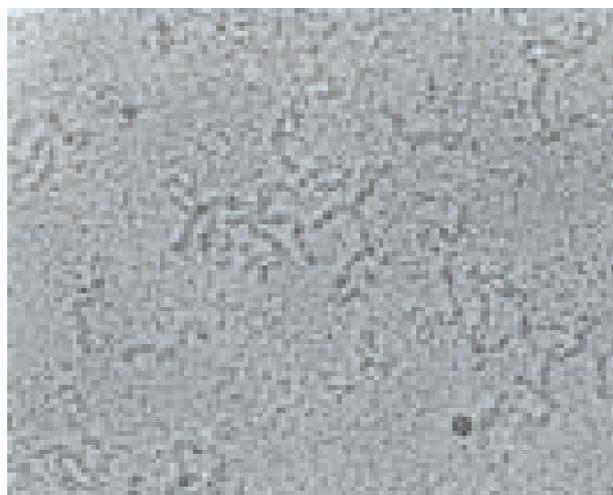
A0830A 6.15 mm carbon rods, unshaped



DNA strands



S8651 carbon rod shaper used (supplied with the K975X/K975S)



Spectrin molecules

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Specification K975X	
Instrument case	450 mm x 500 mm x 300 mm (WxDxH)
Weight	65 kg
Work chamber	Borosilicate glass with hinged top plate, 250 mm Ø x 300 mm H (can accommodate wafers to 200 mm if K975S is specified)
Safety shield	Polycarbonate cylinder, removable for maintenance
Carbon source	Adjustable height with tilt control of 0-200°. Uses 6.15 mm Ø carbon rods
Metal source	Adjustable height with tilt control of 0-200°. Supplied with pack of 10 B5230 tungsten specimen baskets
Specimen stage	Includes 0-45° tilt facility
Vacuum gauge range	ATM - 1×10^{-7} mbar
Operating vacuum	1×10^{-5} mbar, typically achieved within 15 minutes
Low voltage evaporation supply	Pulsed or variable control. Selectable: 0-5 V-15 V-25V, out-gas current: 0-25 A
Services	Nitrogen gas (if you used for venting). Argon gas (if the optional sputtering attachment is fitted)
Vacuum pumping	100 l/sec turbo-molecular pump. Requires a 50 l/min 'backing' rotary pump with oil mist filter (EK3175)
Electrical supply	230 V/50 Hz (8 A maximum including pump), 115 V/60 Hz (16 A maximum including pump)
Supplied with	Accessory kit including: carbon rod (6.15 mm x 100 mm), evaporation filaments, S8651 manual rod shaper and operating manual



Ordering information	
K975X	Turbopumped thermal evaporator
K975S	Turbopumped thermal evaporator with loading stage to accept a 200 mm wafer
Pumping	
50 l/min rotary pump is needed to 'back' the turbopump (EK3175 recommended for normal use)	
EK3175	Edwards RV3 50 l/min two-stage rotary pump with vacuum hose, coupling kit and oil mist filter
O7803	Basic oil mist filter (spare)
A1944A	1 l Ultragrade rotary pump oil (spare)
EK3170	Diaphragm pump MD1 23 l/min
EK3172	XDS10 scroll pump
Stages and other options	
EK4160	Low-angle shadowing. Ideal for flat TEM specimens
EK4205	Rotary planetary specimen stage with externally adjustable tilt
EK4175	Sputtering module, including chromium (Cr) target (other targets available as options, see Q150T for full list)
10983	Film thickness monitor attachment with controller mounted in the K975X console. Includes monitor and stage complete with quartz crystal holder and quartz crystal
A7054	Specimen baskets - tungsten, pack of 10
B5228	Molybdenum (Mo) boat (for use with EK4117)
B5230	Specimen baskets - tungsten, pack of 10
B5236	Basket heater (for use with EK4117)
B5240	Tungsten evaporation source (BN crucible for use with B5236)
B5246	Tungsten boat (for use with EK4117)
EK4117	Metal evaporation source/aperture cleaning head (spare)
Carbon accessories	
A0830A	Carbon rods, unshaped 6.15 mm Ø x 100 mm
A0819	Carbon fibre cord, high purity (1 m)
A0819-5	Carbon fibre cord - high purity - 5 m
C5421	Carbon fibre cord - standard grade (1 m)
C5421-10	Carbon fibre cord - standard grade (10 m)
C5421-100	Carbon fibre cord - standard grade (100 m)
S8651	Manual shaper for 6.15 mm Ø carbon rods (supplied with K975X/K975S)