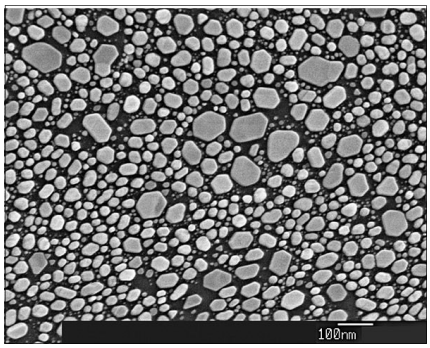
EM Calibration Standards

SEM Calibration Specimens

High Resolution Gold on Carbon Test Specimen

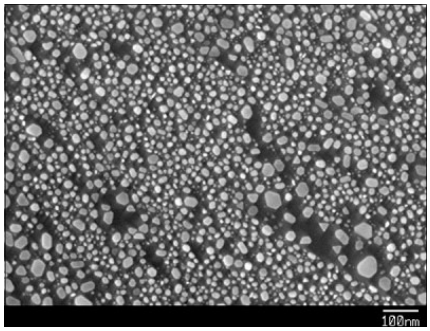


For assessing the resolution in SEM's this sample is suitable for tests of SE and BSE imaging and also for chemical mapping in high resolution systems such as an Auger scanning instrument.
Each specimen has a square grid pattern with large crystals in the centre of each grid square and very fine crystals at the edges of each grid. Hence medium and high resolution gap tests are performed on the same specimen. In addition the larger crystals show facets which allow an assessment of the grey level reproduction available at high resolution

Particle sizes range from approx. 5nm to 150nm.

S120 High resolution Au-C test specimen on 12.5mm (½") pin stub
S120/S High resolution Au-C test specimen on 12.5mm (½" Ø) short pin stub (6mm)
S194 High resolution Au-C test specimen on JEOL stub
S195 High resolution Au-C test specimen on ISI stub
S196 High resolution Au-C test specimen on Hitachi stub
Available on other stubs to order - please ask

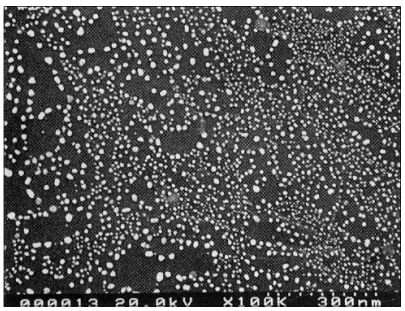
Ultra High Resolution Gold on Carbon >2nm-30nm



For very high resolution performance testing this specimen has a smaller gold island particle size compared with the S120 specimen above. Suitable for testing at instrument magnifications of 50,000x and above. Particle size range from >2-30nm

S326 Ultra high resolution test specimen (gold) on 12.5mm (½") pin stub
S326J Ultra high resolution test specimen (gold) on JEOL stub
S326I Ultra high resolution test specimen (gold) on ISI stub
S326H Ultra high resolution test specimen (gold) on Hitachi stub
Available on other stubs to order - please ask

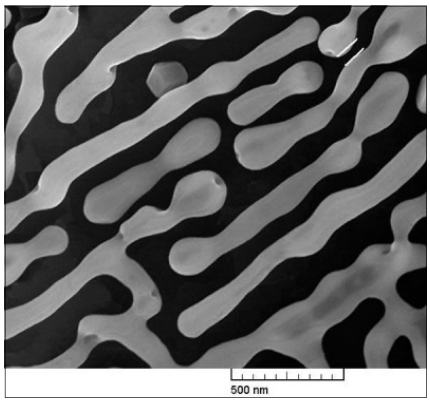
Ultra High Resolution Gold on Carbon <1nm-20nm



Particularly suited for assessing the image quality of ultra high resolution SEM's such as those fitted with field emission sources. A magnification of at least 80,000x is required to clearly resolve the gold particles. Particle size range from<3nm to 50nm.

S328 Ultra high resolution test specimen (gold) on 12.5mm (½") pin stub
S328J Ultra high resolution test specimen (gold) on JEOL stub
S328I Ultra high resolution test specimen (gold) on ISI stub
S328H Ultra high resolution test specimen (gold) on Hitachi stub
Available on other stubs to order - please ask

Medium Resolution - Aluminium Tungsten Dendrites



The various spacings created by the dendritic structure give the gap test, and the topographical arrangement of the dendrites leads to the grey level test. The specimen is non-magnetic, vacuum clean, has no adverse reaction to the electron probe and requires no surface coating. It is most useful for working in the probe size range from 25 - 75nm. Supplied unmounted but can easily be attached to a stub with a proprietary stub adhesive.

S604 SEM medium resolution and grey level test specimen

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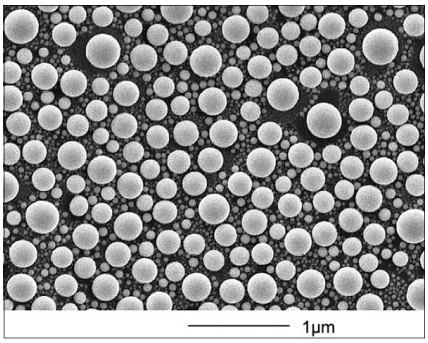
SEM Medium Resolution Test Specimen Tin on Carbon

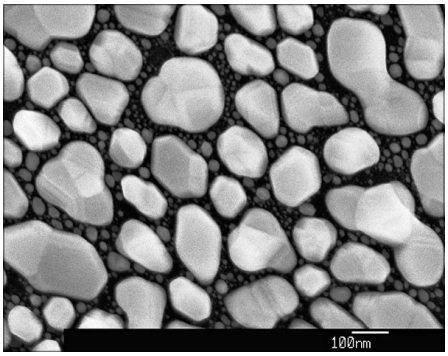
An alternative test specimen for medium resolution evaluation and for the day-to-day visual checking of instrument performance is a tin on carbon specimen. This consists of a dispersion of tin spheres within the size range 10 - 100nm, on a carbon substrate. Ideal for astigmatism correction, it is also recommended for use in SEMs employed in the semiconductor industry, where the usual gold on carbon sample cannot be used because of the risk of gold poisoning. Particle size range from approximately <10—100nm



S437 Tin on carbon medium resolution test specimen on *12.5mm Ø std pin stub*
S437/J Tin on carbon medium resolution test specimen on *10mm Ø JEOL stub*
S437/JB Tin on carbon medium resolution test specimen on *12.5mm Ø JEOL stub*
S437/I Tin on carbon medium resolution test specimen on *ISI/ABT stub*
S437/H Tin on carbon medium resolution test specimen on *15mm Ø Hitachi stub*

Low Voltage SEM Resolution Test Specimen Gold on Carbon

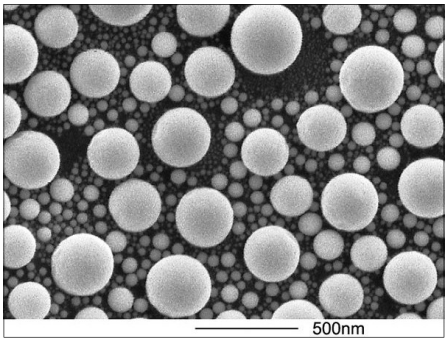
Standard gold or tin on carbon resolution specimens may not be suitable for operating at low accelerating voltages or for use with older instruments. This may be due to inferior resolution at low voltage or poor signal-to-noise ratio when operating at high scanning rates with small spot sizes. The larger gold islands give high contrast while retaining small gaps for resolution measurement, making this specimen easier to use at non-optimal operating conditions. Particle size range from approximately <30 - 300nm.



S435 Low kV gold on carbon test specimen on *12.5mm Ø std pin stub*
S435/S Low kV gold on carbon test specimen on *12.5mm Ø short (6mm) pin stub*
S435/J Low kV gold on carbon test specimen on *10mm Ø JEOL stub*
S435/JB Low kV gold on carbon test specimen on *12.5mm Ø JEOL stub*
S435/I Low kV gold on carbon test specimen on *ISI/ABT stub*
S435/H Low kV gold on carbon test specimen on *15mm Ø Hitachi stub*

Low Voltage SEM Resolution Test Specimen Tin on Carbon

Similar to the S435 specimen, this tin on carbon specimen with larger spheres is easier to use in low kV imaging mode and where gold on carbon may not be appropriate. The spherical nature of the balls makes them ideal for astigmatism assessment. Particle size range from approximately <20 - 400nm.



S436 Low voltage tin on carbon test specimen on *12.5mm Ø std pin stub*
S436/J Low voltage tin on carbon test specimen on *10mm Ø JEOL stub*
S436/JB Low voltage tin on carbon test specimen on *12.5mm Ø JEOL stub*
S436/I Low voltage tin on carbon test specimen on *ISI stub*
S436/H Low voltage tin on carbon test specimen on *15mm Ø Hitachi stub*

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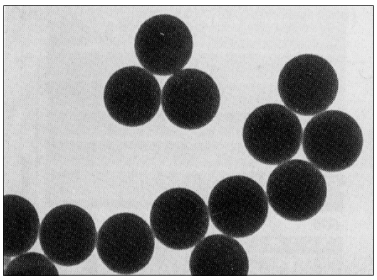
Suspended Polystyrene Latex Spheres

A drop from a suspension of Dow Corning uniform polystyrene latex spheres can provide a useful size check when added to any preparation for TEM or SEM. The spheres can also act as a focus aid or to delineate structure of low slope when the preparation has been shadow cast. The particle sizes are listed below with the standard deviation.



It should be noted that although the standard deviations are very small, the suspension may contain some particles of materially different diameter from the mean. A statistically significant number of latex particles should be included in any micrograph where a size comparison is to be attempted.

It is important not to subject these spheres to excessive irradiation. All solutions are approx. 0.1% weight/volume. Packed in vials of 5ml.

Cat no.	Mean Ø µm	Standard deviation µm	Approximate particle concentration n/ml
P404	0.112	0.0010	1.29×10^{12}
P405	0.132	N/A	7.91×10^{11}
P406	0.182	N/A	3.02×10^{11}
P407	0.204	0.0019	2.14×10^{11}
P408	0.303	0.0019	6.60×10^{10}
P409	0.520	N/A	1.29×10^{10}
P410	0.945	N/A	2.34×10^{10}

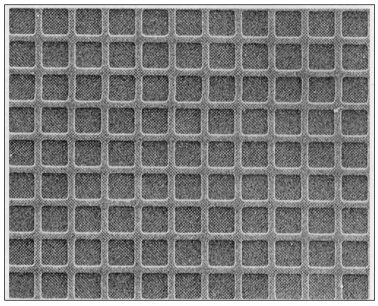
Please Note

Actual mean diameters and concentrations can vary from batch to batch according to production circumstances. We will supply the nearest matching available spheres.

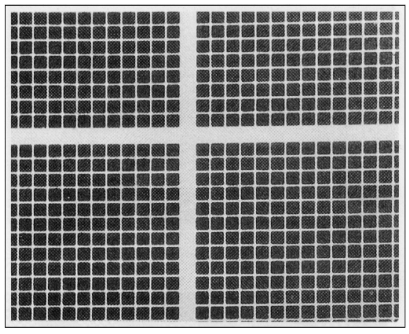
Silicon Test Specimen for SEM & LM

This test specimen is made of a single crystal silicon of overall dimension 5mm x 5mm. It is marked with clearly visible squares of periodicity of 10µm. The dividing lines are about 1.9µm in width and are formed by electron beam lithography. A broader marking line is written every 500µm. This is a very useful additional feature for Light Microscopy.

This is an excellent specimen for comparing magnification and assessing any distortion in the image field.



High Mag



Low Mag

S336	Planotec silicon test specimen unmounted	each
S327	Planotec silicon test specimen on 12.5mm SEM stub	each
S336/C	Calibration certificate (can be supplied at extra cost if required) Available on other stub types - please specify	
S350	Planotec silicon test specimen for incident light microscopy	each