Hitachi Electron Microscopes: At The Forefront Of Research

Hitachi’s rapidly expanding range of high-end instrumentation is at the forefront of nanoscience. Although outstanding resolution and instrument performance is of paramount importance in this field, Hitachi isn’t satisfied with simply developing some of the world's best electron microscopes. The company recognises the need for the development of complete techniques to complement the microscopes and invests heavily in these areas to ensure our technology contributes to the progression of nanoscience. Every instrument in Hitachi's range is designed to ensure it can help answer practical research or engineering challenges with the greatest of simplicity.

Hitachi's full-technique development can range from unique 3D visualisation methods to material specific surface-functionalized holders & nanometre-resolved strain measurement. Throughout the equipment range, from TEM to STEM and SEM, there are instruments and accessories designed to form investigative tools to address practical challenges.

In addition, each customer benefits from the sophisticated technical support, back-up and service that would be expected for products that bear the Hitachi name.

Transmission Electron Microscopy

Hitachi employs recognised pioneers and world authorities in a number of materials investigation techniques such as electron holography, ultra-high voltage EM and in-situ TEM. This is reflected in a number of instruments, particularly the advanced 300kV HF-3300 TEM/STEM. With its cold field emission gun (CFEG) technology it delivers superior spectroscopic performance with outstanding electron holography capabilities, particularly with the double-biprism configuration. It offers the versatility to allow researchers to push the limits of electron microscopy.

Hitachi has also developed new & unique methods for 3D visualization through tomographic reconstruction. These methods are demonstrating a step-change in the precision of reconstruction compared to conventional weighted back projection and SIRT methods and ensure more effective visualization of the three-dimensional structures and properties of materials.
Another area in which the company has built extensive practical experience is with in-situ dynamic experiments in TEM.

Adjustable pressure and high-stability high-temperature holders are combined to give catalysis and nanoparticle researchers new insights into real-time gas-solid interactions at the atomic level.

**Scanning Transmission Electron Microscopy**

A new era of dedicated STEM instruments is providing advanced analytical capabilities for materials scientist. Combining the STEM with the latest parallel EELS, exceptionally high solid angle EDX and live nanobeam and convergent beam diffraction enables highly spatially resolved analytical data to be acquired simultaneously with high resolution imaging. The introduction of Cs corrected STEM with sub-Angstrom capabilities is pushing back even further the boundaries of spatially resolved analysis, with extensive research on atomic sensitivity EELS.

**Scanning Electron Microscopy**

Hitachi FE-SEMs are breaking new ground in a number of directions. They offer outstanding resolution capabilities and STEM capabilities, pushing the boundaries closer to those usual associated with TEM. Similarly, they are also challenging the capabilities of fast, ultra-high sensitivity analysis usually associated with dedicated microprobe equipment.

The unique in-lens S-5500 FE SEM offers unparalleled resolution. Recent examples of carbon lattice imaging in this instrument give an indication of the future direction of in-lens SEM and ensure that this technology will be at the forefront of new materials research. With advanced detection capabilities, information can be easily derived on surface morphology, compositional makeup and internal structure to give comprehensive characterisation of materials. High solid-angle EDX also
enables spatially resolved analysis approaching the nanometer scale - EDX spatial resolutions previously associated with TEM/STEM.

A comprehensive range of analysis techniques is available on advanced analytical FESEMs such as the large chamber SU-70. With exceptional high current and high resolution capabilities it combines the best of high-resolution SEM and high-sensitivity microprobe into one highly flexible instrument.

**Keeping in Touch**

Keeping in touch with forthcoming developments from Hitachi ensures that anyone involved in research, materials science and nanotechnology will be aware of the very latest electron imaging and analysis tools and techniques available. It all makes perfect sense.

**Contact**

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