



WINNER



2004 R&D 100 Awards Winner **Confocal X-Ray Fluorescence Microscope**

Our microscope uses x-ray fluorescence to nondestructively measure the concentrations of elements within a tiny quasi-spherical "probe volume." The microscope moves the x-ray probe volume on or through an object to measure elemental concentrations on the object's surface, beneath a specific spot on the surface, or throughout the object's interior. The microscope measures the concentrations of a wide range of elements with parts-per-million sensitivity. It can analyze objects as thick as a few millimeters with a spatial resolution of 15 micrometers.

Applications

- Analysis of fine-art paintings, i.e., nondestructive studies of valuable paintings in situ
- Identification of elements present in radioactive waste for conversion to forms suitable for long-term storage
- Inspection of Space Shuttle thrusters
- Quality control of pharmaceuticals
- Characterization of new types of films for the semiconductor industry
- Analysis of crime scene evidence—enhances forensic information provided by other types of microscopes