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Materials Characterization by Analytical Electron Microscopy

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Examples will be presented of materials characterization by the techniques of:
energy-filtered transmission electron microscopy (EFTEM) elemental mapping,
TEM spectrum lines,
spectrum imaging and profiling in scanning transmission electron microscopy
(STEM) mode, and
atom location by channeling enhanced microanalysis.

These examples will serve as the basis for discussing present capabilities and limitations, and specific needs for instrumentation development for revolutionary improvements in sensitivity and resolution, including bolometer X-ray detectors, electron monochromators, pre- and post-specimen aberration correctors, imaging energy filters and high-resolution energy-loss spectrometers. Needs for improved specimen preparation methods, including focused ion beam (FIB) thinning will also be addressed.

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