New Generation of X-ray Sources for Imaging and Analysis

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Content

Innovations in laboratory x-ray sources are important to effectively use the outstanding capabilities of x-ray based imaging and analysis techniques, including tomography, XRF, XAS, XRD, XSAS, and XPS. Important performance attributes for these techniques include spectral brightness, spectral purity, spectral selectivity, source size and spatial distribution. Sigray has developed a new generation of x-ray sources with many superior performance attributes than current x-ray sources used in these techniques, including, for example, high source brightness, multiple characteristic x-ray lines in one source that can be selected with a push button control, and array of micro-sources for Talbot-Lau interferometer imaging.

Application examples enabled by the x-ray sources will be presented. For example, a sensitivity of 0.1Å equivalent film thickness with an analysis spot of 20um was achieved using a microXRF system using such a new source. With reference standard, precision of equivalent film thickness or dose of material with an accuracy better than 1% can be achieved. The system is capable to measure many points on a 300mm wafer. Because it can be used in ambient pressure, this non-destructive technique can be used as a complementary upstream technique to SIMS or FIB-SEM to identify regions of interest. Such a source also enabled the development of laboratory x-ray absorption spectroscopy system that can obtain a high quality XANES and EXAFS spectrum within 10 minutes.