

Full field energy dispersive X-ray fluorescence imaging and compressed sensing analysis for super-resolution analysis

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Full field ED-XRF (FF-EDXRF) imaging technique is useful for simultaneous imaging of multi-elements. The primary x-rays are irradiated on the sample with a large area. XRF signals emitted from the sample are measured by a normal x-ray CCD camera. A single photon counting analysis is applied for energy analysis of the XRF [1].

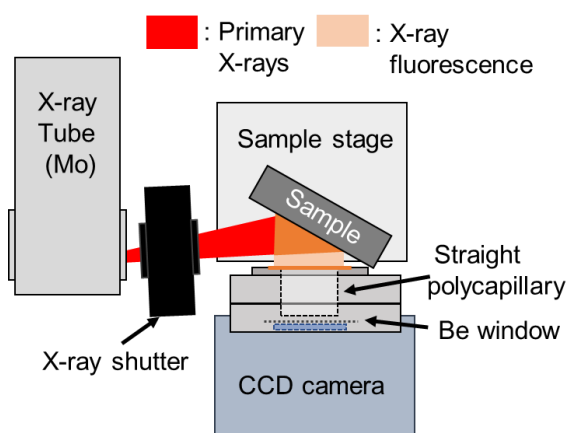


Fig. 1 Schematic drawing of FF-EDXRF imaging spectrometer.

FF-EDXRF imaging spectrometer was developed at OCU by taking kind suggestions from Dr. P. Romano [1,2]. As shown in Fig. 1, an exposure time was controlled by using x-ray shutter. A typical EDXRF image was taken with an exposure time of 0.2 s per frame, a few thousands frames.

Compressed sensing is well known technique for improving an image resolution [3,4]. In this work, we applied compressed sensing technique to FF-EDXRF images, which were original XRF low resolution images. Finally, the high resolution XRF images could be successfully obtained.

References

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