Confocal line XRF analysis in comparison with confocal point micro XRF analysis

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Confocal micro XRF (CM-XRF) is useful technique to analyze a small volume in the sample. In the laboratory, two polycapillary optics are applied for XRF excitation and detection. Two foci of polycapillary optics are adjusted at the same point, that is confocal point. This CM-XRF technique enables depth selective XRF imaging, cross-sectional XRF imaging, and finally 3D XRF imaging [1]. CM-XRF analysis is useful especially for the heterogenous sample. This is a scanning technique; therefore, it takes a long time to obtain XRF elemental images for a large area or volume.

In the case of layered structure sample, 2D depth imaging is not necessary. Therefore, we propose confocal line XRF analysis. We prepared a sheet type primary x-rays using a Soller slit and a limiting slit. Then, XRFs emitted from the layered sample were measured thorough a Soller slit and a limiting slit. Instead of Soller slit and limiting slit system, other focusing optics will also be applied in the future. The confocal volume was not point but line shape in this experimental arrangement. The depth resolution, evaluated by scanning a metal thin layer, was several tens micro meters. Elemental depth profiling was performed for leather samples, which has a layered elemental structure. The same sample was measured by conventional CM-XRF in our laboratory [2]. We consider that this new technique is useful for depth elemental analysis of layered samples.

References

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