In-lab Micro XRF at high lateral resolution

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Abstract

XRF (X-ray Fluorescence) is a powerful technique for elemental analysis. The lateral resolution is given by the excitation beam diameter in classical XRF configuration or by the characteristics of the optics used for fluorescence signal collection in the case of confocal XRF. We have developed a software to estimate the ultimate lateral resolution which could be reached in XRF analysis as a function of source brightness by calculation of the collected signal magnitude. These calculations are based on the finite element method. To check the simulation data pertinence, we have developed an XRF test-bed using an Rh-target low power source (figure 1). A polycapillary lens is used to tightly focus the primary beam and the sample X-ray fluorescence is collected through a cylindrical capillary [1]. Both capillaries are positioned in a confocal type configuration. The influence of the capillary radius, length and working distance on the fluorescence signal magnitude collection is investigated. Simulations allow to predict the ultimate limit of the technique in terms of lateral resolution. Further measurements replacing cylindrical capillary by elliptical capillaries are presented.

References

[1] M. Dehlinger, C. Fauquet, S. Lavandier, O. Aumporn, F. Jandard, V. Arkadiev, A. Bjeoumikhov and D. Tonneau, Nanoscale Research Letters 2013, 8:271

Figures

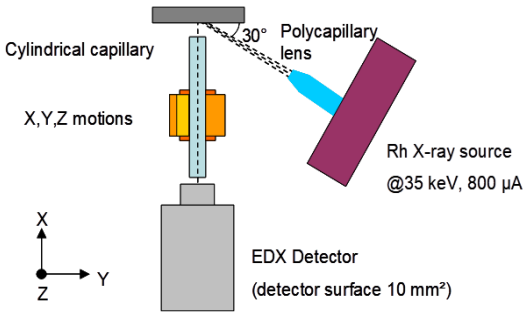

Figure 1. Test bed for simulation results validation