

HIGH SPEED 2D AND 3D MXRF-IMAGING WITH BENCH TOP TECHNOLOGY

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Micro X-ray fluorescence (MXRF) has been a powerful analytical tool in material science, quality control, forensics and archaeometry for more than fifteen years meanwhile. The combination of a highly efficient X-ray excitation and detection technology with a high-speed scanning and data processing technology gave the method a considerable progress in the early past. The new analytical performance of such a system is presented in this report.

The polycapillary X-ray optics and the 30 mm² SDD detector technology of the MXRF-spectrometer M4 TORNADO produce X-ray count rates above 100 kcps for typical samples. In combination with a “On the Fly” scanning and spectra storage technology (HyperMap), overview mappings with good contrast can be received in minutes and high performance spectroscopic images in one hour. The availability of the whole spectra for every pixel gives the possibility for a further post processing and extends the system to a multi-imaging system for the X-ray interactions with matter. Additional to typical MXRF-mappings, images in Bragg-, high- and low-energy scatter contrast are presented.

Although the MXRF is a nondestructive method, the combination with a preparative grinding slide by slide technology offers the possibility of a 3D elemental reconstruction in high absorption materials. Different examples of the application of this method in geological and material science are presented.