

## **A COMPACT, POLYCAPILLARY-BASED MICRO X-RAY FLUORESCENCE ANALYSIS SYSTEM**

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A compact micro x-ray fluorescence (MXRF) system combining a low-power microfocus x-ray source, a polycapillary x-ray focusing optic and a compact energy-dispersive spectrometer was designed and built. With the recent improvement in polycapillary optic design and manufacturing, a focal spot size of less than 15  $\mu\text{m}$ , FWHM, was achieved at Mo  $K\alpha$  (17.4 keV). A Mo  $K\alpha$  intensity of higher than  $1 \times 10^8$  photon/second was obtained with the microfocus x-ray source operating at 15W. The x-ray flux density was more than four orders of magnitude higher than that from a pinhole aperture 100  $\mu\text{m}$  to the x-ray source. Various samples were analyzed and the results were discussed. Further improvement in design and manufacturing of polycapillary optics that would reduce the spot size below 10  $\mu\text{m}$  at Mo  $K\alpha$  in the future was discussed. Such spatial resolution will dramatically extend the applications of MXRF analysis in industries and researches.