Effective polarization scheme based on polycapillary optics and a diamond crystal polarizer is demonstrated. The scheme provides suppression of the background of scattered radiation in measuring X-ray fluorescence spectra. A quasi-parallel X-ray beam with an angular divergence of 4.2 mrad was formed by a microfocus source with a copper anode and polycapillary half-lens. Simultaneous polarization and monochromatization of radiation was obtained with a crystal of natural diamond, which was set at the diffraction reflection (113). The degree of polarization of CuKα1 spectral line and the maximum radiation flux were respectively equal to 99.86% and $5 \times 10^6$ photon·s⁻¹. In the direction orthogonal to the plane of diffraction, the maximum attenuation of the background was up to 19 dB.

Fluorescence and scattering spectra from the Sn foil exited by the CuKα1 line: full spectrum in the plane of diffraction (a); orthogonal to the plane of diffraction (b).