

SPring-8 Sheds Light on Trace Evidence from Crime Scenes!

Recently, in Japan, the deterioration of public security has become a major issue compared with during the Showa era (1925-1989). Recent crimes have become increasingly serious and so well-orchestrated that hardly any evidence remains at the crime scenes. Thus, the police must search for trace evidence (see Fig. 1) and forensic scientists must analyze this evidence carefully.

In police laboratories, there are various types of analytical machine such as optical microscopes, and SEM/EPMA, GC-MS, LC-MS, FT-IR, XRF, and XRD systems (see Fig. 2). However, analysis using such machines is not sufficient. SPring-8 synchrotron radiation plays an important role in analyzing trace evidence with high sensitivity and without damaging the evidence.

Figure 3 shows a glass fragment, a typical piece of trace evidence, stored in a plastic bag for synchrotron radiation analysis. Figure 4 shows an XRF spectrum of a small SRM612 glass fragment analyzed using high energy X-rays of 116 keV at the High Energy Inelastic Scattering Beamline, BL08W, of SPring-8. As shown in Fig. 4, many peaks of rare earth elements at concentrations of about 50 ppm in the glass fragment are clearly observed, whereas such peaks are hardly detected with desktop or laboratory XRF machines.

Currently many trace evidence materials are being analyzed using SPring-8 synchrotron radiation in order to solve serious crimes.



Fig. 1 Police officers searching for trace evidence at a crime scene.



Fig. 2 A forensic scientist handling an SEM/EPMA system.

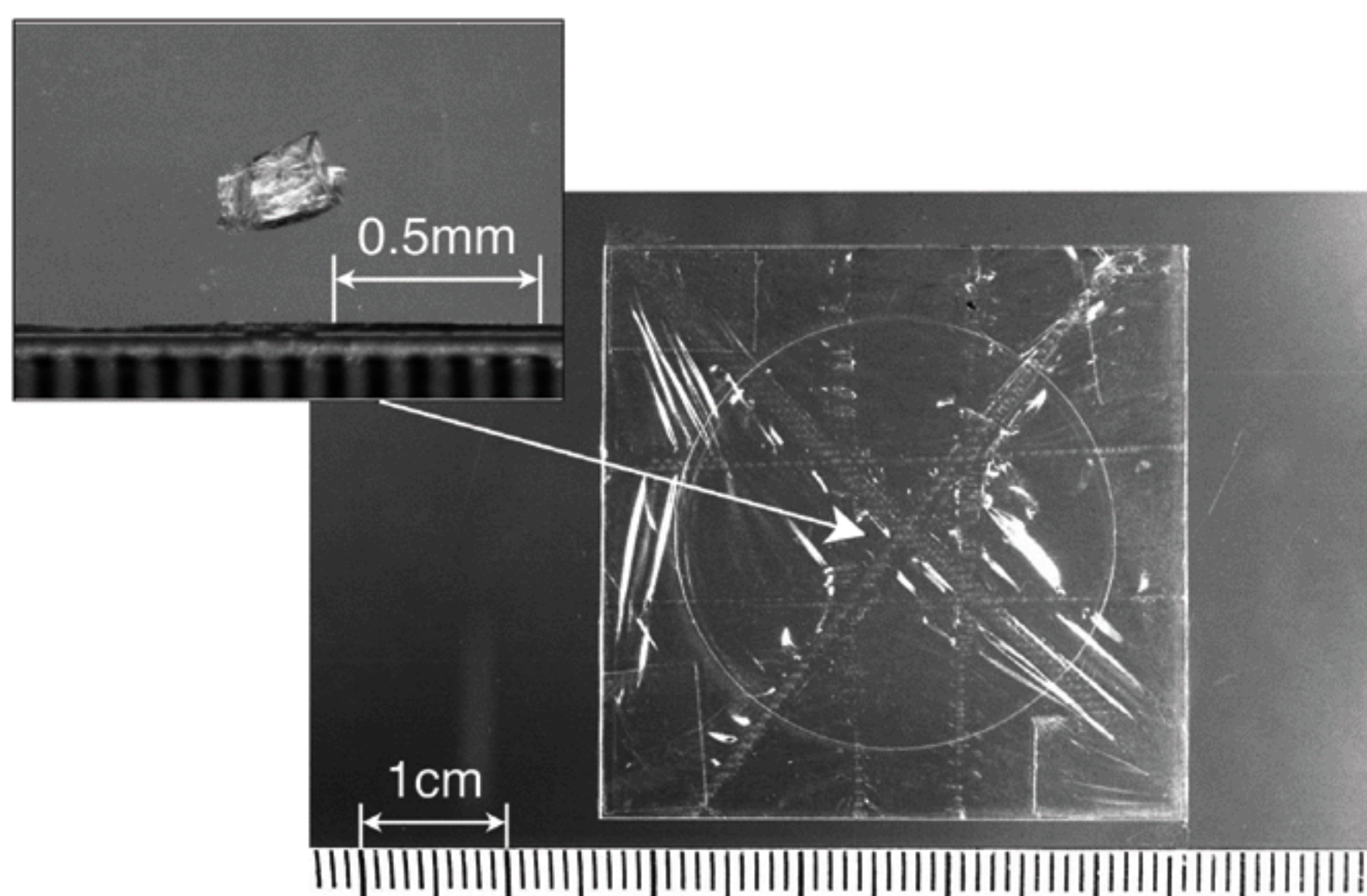


Fig. 3 Sample holder containing small glass fragment for SR analysis.

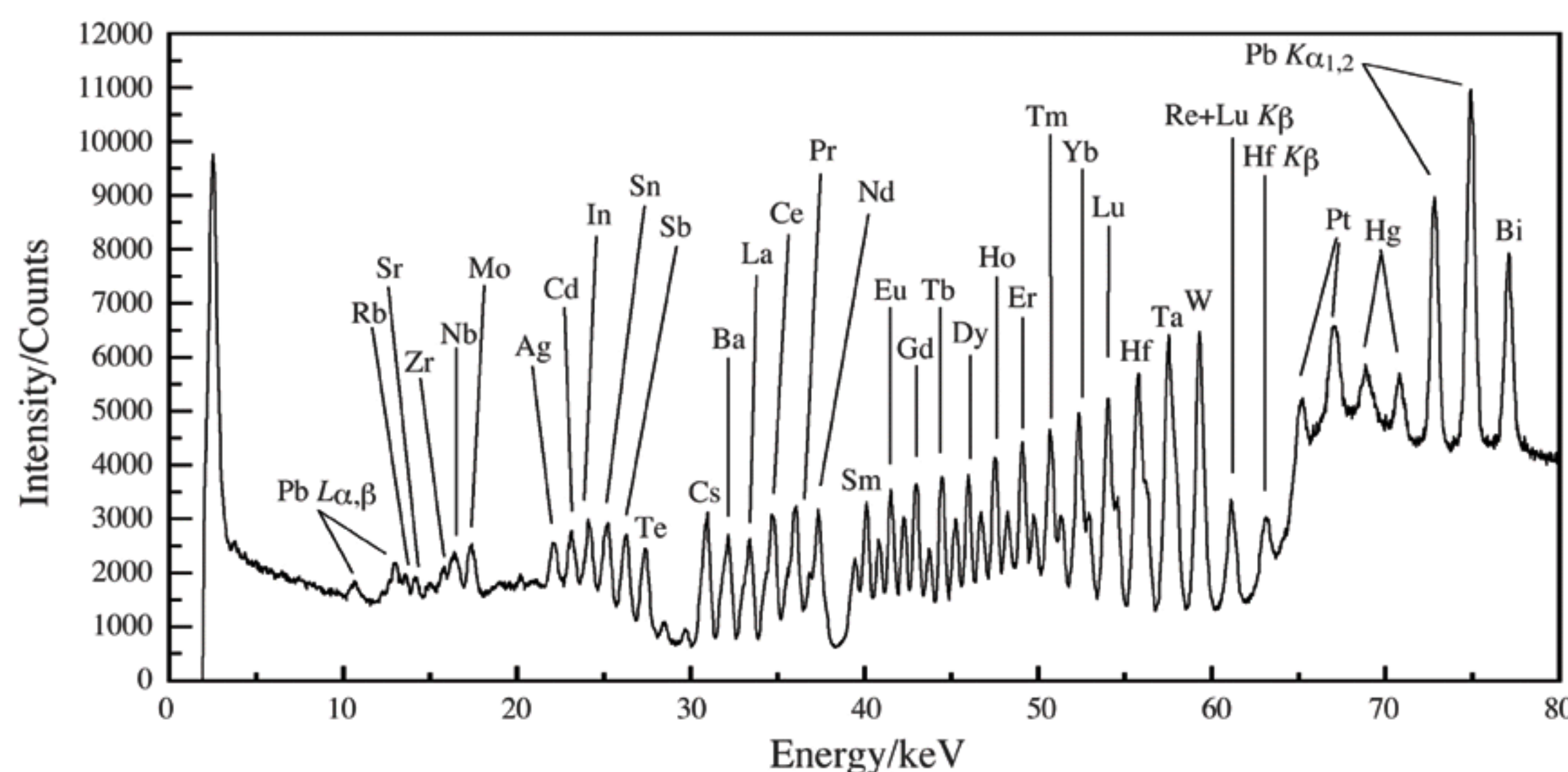


Fig. 4 XRF spectrum of standard SRM612 glass fragment excited by 116 keV X-rays.

[Figures: courtesy of Hyogo Prefecture Police Headquarters, Forensic Science Laboratory]

Reference: Y. Nishiwaki, T. Nakanishi, Y. Terada, T. Ninomiya and I. Nakai; *X-Ray Spectrometry* **35**, 195-199 (2006)

IXS2007

The 6th International Conference on Inelastic X-ray Scattering (IXS2007) will be held at Awaji Yumebutai, Awaji City, Hyogo, Japan, from May 7 to 11, 2007.

<http://ixs2007.spring8.or.jp/>

WIRMS2007

International Workshop on Infrared Microscopy and Spectroscopy with Accelerator Based Sources (WIRMS2007) will be held at Awaji Yumebutai, Awaji City, Hyogo, Japan, from September 25 to 29, 2007.

<http://www.uvsor.ims.ac.jp/WIRMS2007/index.htm>