

Intensity and polarization of Compton scattering by light-element polarizer

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The intensity and polarization of Compton-scattered X-rays were measured by using acrylic plates with different thicknesses as polarizers. When measuring the intensity, an X-ray tube, acrylic plate, and detector were arranged in such a way that the incident and take-off angles were 45° . The polarization was observed by measuring the intensity of scattered X-rays at detection angles of 0° and 90° as shown in Fig.1. An acrylic of 5 mm thickness was used as a scatterer. The scattering intensity increased with increasing thickness of the acrylic (Fig.2). The polarization decreased with increasing thickness of the acrylic (Fig.3).

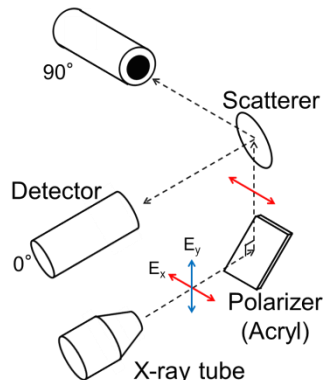


Fig.1. Experimental setup for the measurements of polarization.

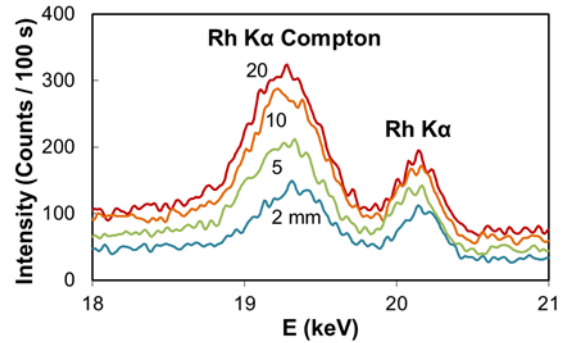


Fig.2. Scattered X-ray spectra when using acrylic plates with different thicknesses.

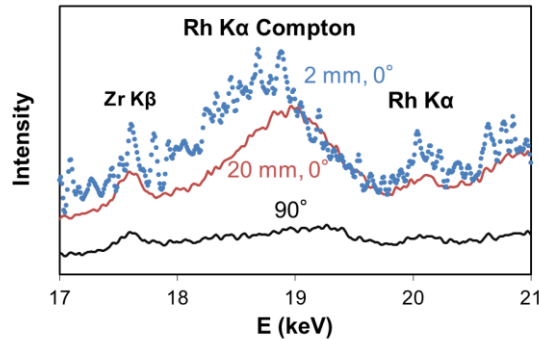


Fig.3. Measured X-ray spectra when using acrylic plates whose thicknesses were 2 and 20 mm. The detection angle were 0 and 90 degrees. The X-ray spectra are plotted so that the intensities measured at 90 degrees become equal. Dotted lines are for 2 mm, and solid lines are for 20 mm.