
# Characterization of polycapillary optics in a TES microcalorimeter EDS system installed on a SEM

**Main author:**

TAKANO Akira

**Co-authors:**

Iyomoto Naoko, Kyushu University
Maehata Keisuke, Kyushu University
Maeno Hiroshi, Kyushu University
Shiiyama Kenichi, Junchin Gakuen University
Takano Akira, Kyushu University
Tanaka Keiichi, Hitachi High-Tech Science
Yasuda Kazuhiro, Kyushu University

A scanning electron microscope (SEM) is a powerful tool used to obtain micro- and nano-scale images of a material surface. A Si (Li) semiconductor detector (SSD) is used for detecting the X-rays in a typical energy dispersive spectroscopy (EDS) system. An insufficient energy resolution of the SSD results in peak overlaps of closely adjacent peaks. The superconducting transition edge sensor (TES) microcalorimeter system has been developed for improving the energy resolution of an EDS performed on the SEM. A TES microcalorimeter EDS system was installed on a SEM. The detection area of the TES microcalorimeter system is need to be improved because the solid angle is three orders smaller than that for conventional EDS system with the SSD. To increase the solid angle, we employed polycapillary optics. The X-ray transmission characteristics of polycapillary optics, such as a focal spot size and intensity gain, typically depend on the geometrical arrangements of the optics and the X-ray energy. The X-ray transmission characteristics are important parameters for determining the geometrical arrangements of the TES microcalorimeter and correcting the obtained X-ray energy spectra. In this work, we carried out energy spectrum measurements for X-rays transmitted by the polycapillary optics installed on the SEM for evaluation of the X-ray transmission characteristics of the polycapillary optics.