

## Development of a High-Precision Slit System for Soft x-ray Transmission-Grating Spectrometer

Toshio Horigome<sup>1)</sup>, Koji Matsushita<sup>2)</sup>, Hisashi Yoshida<sup>1)</sup>,  
Takuhiko Kondo<sup>1)</sup>, and Takaki Hatsui<sup>1)</sup>

1) *Institute for Molecular Science, Myodaiji, Okazaki, 444-8585, Japan*

2) *Technical Center of Nagoya University, Chikusa-ku, Nagoya, 464-8602, Japan*

We have developed a newly developed transmission-grating spectrometer for high resolution soft X-ray emission studies. This spectrometer is designed to realize a resolution  $E/\Delta E$  up to 5000 in the energy region of 50-600 eV with high throughput [1]. The spectrometer has a Wolter type I premirror, a free-standing transmission grating, and a back-illuminated CCD. The Wolter mirror with a high collection angle of  $1.5 \times 10^{-3}$  sr enables higher throughput than the conventional spectrometer. In order to obtain high energy resolution, an UHV-compatible entrance slit with the slit opening of 1-30  $\mu\text{m}$  has been developed. The slit blades are mounted on a flexure guided stage in combination with a piezo actuator (Fig 1). The piezo actuator located around the center of the frame is inclined so as to open the slit keeping the blades parallel. The actuator motion is magnified by about 12. The slit opening is feedback controlled by monitoring a capacitance sensor attached to the frame.

Ref. [1] T. Hatsui et. al., J. Electron Spectrosc. Relat. Phenom., 144 (2005) 1059.

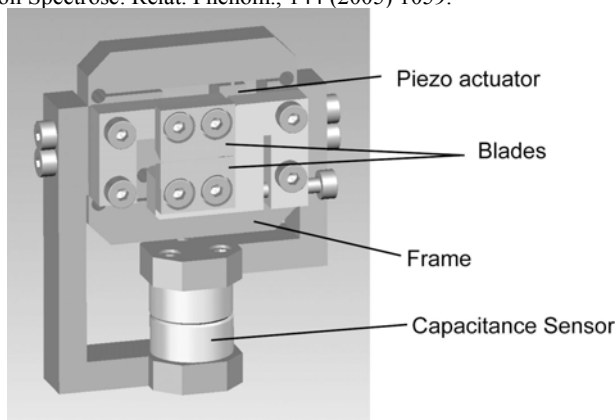


Figure 3. Top view of a set of slit blades observed by SEM