

## Soft X-ray Photochemistry (BL27SU)

This beamline is designed for research on soft X-ray photochemistry and soft X-ray CVD [1].

In the soft X-ray photochemistry research, the light from a new type of linear polarization soft X-ray undulator (Figure-8 undulator [2-4]) is monochromatized by a high efficiency, high resolution spectrometer in order to study the photoionization dynamics of atoms and molecules, as well as spectroscopy, electronic relaxation, and dissociation dynamics of the inner shell excited molecules. For these purposes, this beamline is equipped with a photoelectron/Auger electron energy analyzer, energy and mass analyzer for ions, and a reflectron-type mass spectrometer. These units are positioned around the incident photon beam axis in such a manner that they can be rotated as a set around that axis, as shown in Fig.1. In addition, the electron analyzer can be rotated independently around the same axis so that the angle between the ion and electron analyzers is continuously variable. In this way, the apparatus allows the measurements of not only the angular distribution of photoelectrons and photoions but also the angular correlation between them.

In the soft X-ray CVD research, soft X-rays from the above undulator is used without dispersing them. By irradiating gaseous or solid samples with them in the range of 130 eV ~ 1.5 keV, we endeavor to achieve the creation, synthesis, and processing of a variety of new materials. The experimental station consists of a reaction chamber, an evaluation system, a differential pumping system, and a temperature controlled simplified gas supply system, (Fig.2). The reaction chamber allows irradiation of solid samples under ultrahigh vacuum conditions, as well as under heated or cooled conditions in the presence of an added gas, including rare gases, nitrogen and oxygen (up to 1 Torr). To facilitate the basic evaluation of samples during and after irradiation, various types of analytical equipments will be installed.

### References

- [1] I. Koyano, *et al.*, *J. Synchrotron Radiation* **5** (1998) 545.
- [2] T. Tanaka and H. Kitamura, *Nucl. Instrum. and Meth.* **A364** (1995) 368.
- [3] T. Tanaka and H. Kitamura, *J. Electron Spectroscopy and Related Phenomena* **80** (1996) 441.
- [4] T. Tanaka and H. Kitamura, *J. Synchrotron Radiation* **3** (1996) 47.

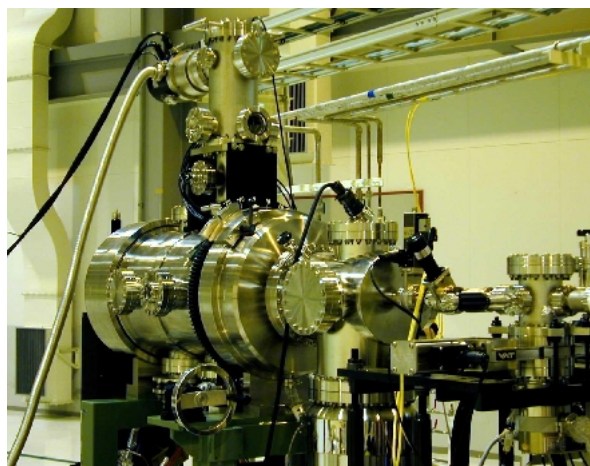


Fig. 1. Apparatus in soft X-ray photochemistry station.

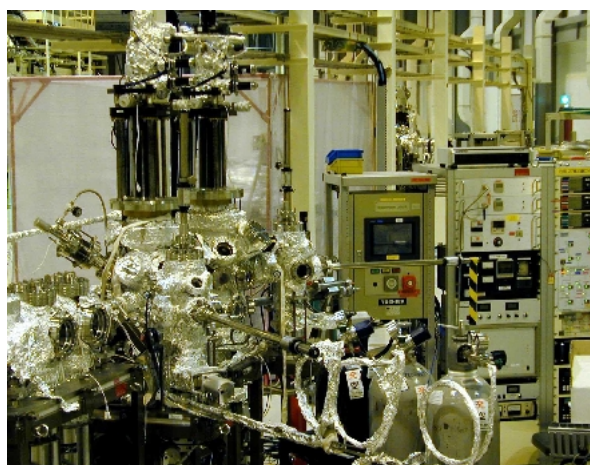


Fig. 2. Apparatus in soft X-ray CVD station.