

Soft X-Ray XAFS Beamline at Compact Superconducting Ring

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Abstract

Using a relatively high photon flux available at a short distance from the source point, a soft X-ray XAFS beamline was constructed at the compact superconducting ring AURORA. It consists of a pre-focusing toroidal mirror and a double-crystal monochromator, 1:1 focusing geometry being adopted. Radiation can be used for an energy in the range from 1000 eV to 4000 eV covered by four kinds of monochromator crystals. XAFS measurements can be made either in a transmission, total electron yield or fluorescence yield mode. The beamline is designed not only for materials research but also for training of undergraduate students in the course of Photonics.

1. Introduction

The compact superconducting ring AURORA (electron beam energy of 575 MeV and initial stored beam current of 300 mA) installed at Ritsumeikan University was originally designed for the use in microfabrication technology, but machine studies in recent years showed that it can also well be used for spectroscopic and diffraction studies[1, 2]. Characteristic feature of the ring is the smallness, 0.5 m, in the radius of the electron orbit and it is possible to put the optical components of a beamline so close to the source point that radiation beam with a high photon flux is available. The maximum intensity of the spectrum of the radiation emitted from the bending magnet of the ring is in the soft X-ray region (in spite of the lower electron beam energy) We constructed an XAFS beamline for the study of local atomic arrangements and electronic structure of

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