Total Reflection X-Ray Fluorescence Using a Compact Synchrotron Radiation Source at Ritsumeikan University


Abstract

This report gives an outline of the energy dispersive total reflection X-ray fluorescence beamline constructed at a small-scale synchrotron radiation facility of Ritsumeikan University.

The optical element used for incident X-rays is a 380 \( \mu \text{m} \) thickness of Si filter; this results in pseudo-monochromatic excitation of approximate 10keV with a wide bandwidth for analyte elements in samples. Limits of detection (LDs) using liquid standard samples were obtained for V, Cr, Mn, Fe, Ni and Cu in the range of 0.01 to 0.1ng in absolute amount. LDs of K and Ca were found to be on the order of ng. Using these samples, the accuracy of quantitative analysis was checked.

When selective monochromatic excitation can be carried out with a crystal or multilayer monochromator, a further improvement on LDs, particularly for light elements, will be expected.