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Element specific imaging by STM combined with synchrotron radiation light TOYOAKI EGUCHI, TAICHI OKUDA, TAKESHI MATSUSHIMA, AKIRA KATAOKA, AYUMI HARASAWA, KOTONE AKIYAMA, TOYOHIKO KINOSHITA, YUKIO HASEGAWA, The Institute for Solid State Physics, The University of Tokyo — Atomically resolved imaging with a capability of elemental identification is one of the ultimate goals in the development of microscopy. Using scanning tunneling microscopy (STM), which provides us atomically resolved surface images, many attempts have been performed for elementally contrasted images. However, since STM basically probes electronic states near the Fermi energy, it is difficult to obtain definite "fingerprints" of elements. Here, we report on a new method to obtain elemental information by STM combined with synchrotron radiation light. We found that, by exciting core electrons with the soft-X-ray irradiation and detecting emitted electrons with the STM probe tip, we can obtain X-ray absorption spectra bearing elemental information of the sample. From the photo-induced current measured during the tip scanning over the surface, element specific images were obtained. An estimated spatial resolution of the chemical imaging is less than 20 nm, better than that achieved by photoemission electron microscopy.

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