

## Application of photoelectron emission microscope (PEEM) on extraterrestrial materials

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Photoelectron emission microscope has been of a powerful tool for studying the various phenomena at the surface or interface, i.e. magnetic coupling at magnetic multilayer, dynamics of domain wall and so on. Because of its powerful performance, it has been carried out on the wide variety of synthetic materials in the field of surface science. However, it has never been so far applied on natural or environmental materials. To expand the strong potential of PEEM, we applied it on the Gibeon iron meteorite in the connection with both hard and soft x-rays.

Here, we observed the spatially resolved crystallographic structure of Chromite ( $\text{Cr}_2\text{FeO}_4$ ) inclusion in Gibeon iron meteorite. Gibeon iron meteorite is one of the most studied meteorites in field of earth planetary science, and they are investigated as information source for the history of solar system. By using x-ray absorption fine structure (XAFS) technique, the Chromite inclusion is successfully observed with sub-micrometer scale resolution and the spectroscopic image characteristically changes depending on the photon energy near K absorption edge of Cr (fig. 1 a,b). We extract the radial distribution function on the each pixel in the projected image obtained by the continuous scanning of photon energy from the absorption edge to the extended region.

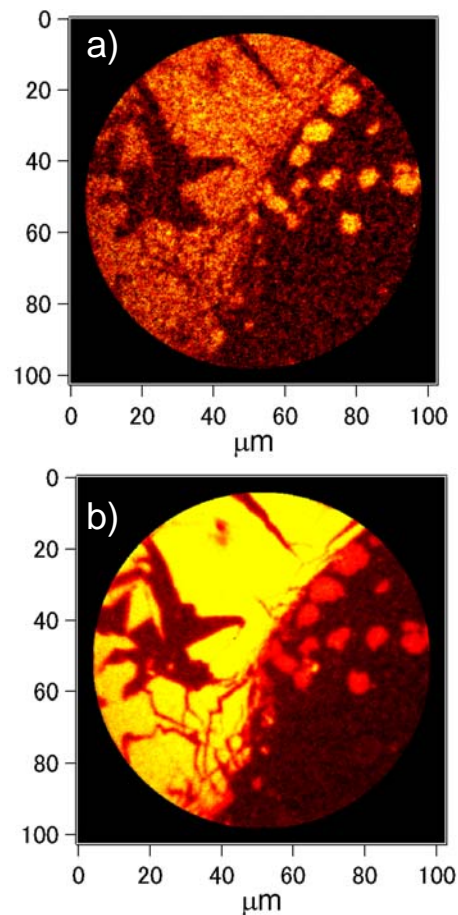


Fig.1: The observed images on the Chromite inclusion at 5.998 keV and 6.007 keV using hard x-ray and PEEM.