

# A scanning soft x-ray microscope in absorption and fluorescence modes at the Pohang Light Source (PLS)

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A scanning transmission x-ray microscope (STXM) has been operational at the Pohang Light Source (PLS), providing element-, chemical state-, and magnetic moment-specific distribution within a sample, based on absorption spectroscopy in transmission mode. Usable photon energy of the STXM ranges from ~200 eV to ~1500 eV. The space resolution is ~30 nm by using a 25 nm outermost zone-wide zone plate in the photon energy range from ~250 eV to ~850 eV, with worse space resolution at higher photon energy. In practical application, sample has to be thin enough. Recently, we have added a soft x-ray fluorescence (soft-XRF) measurement setup in order to probe thicker samples' elemental distribution as well as chemical state information, at a space resolution of ~50 nm; for the latter case, by changing the incident photon energy. Also, we have implemented Ptychography setup in order to improve the space resolution down to less than 10 nm. Hardware setups and application activities on the upgraded STXM will be presented.

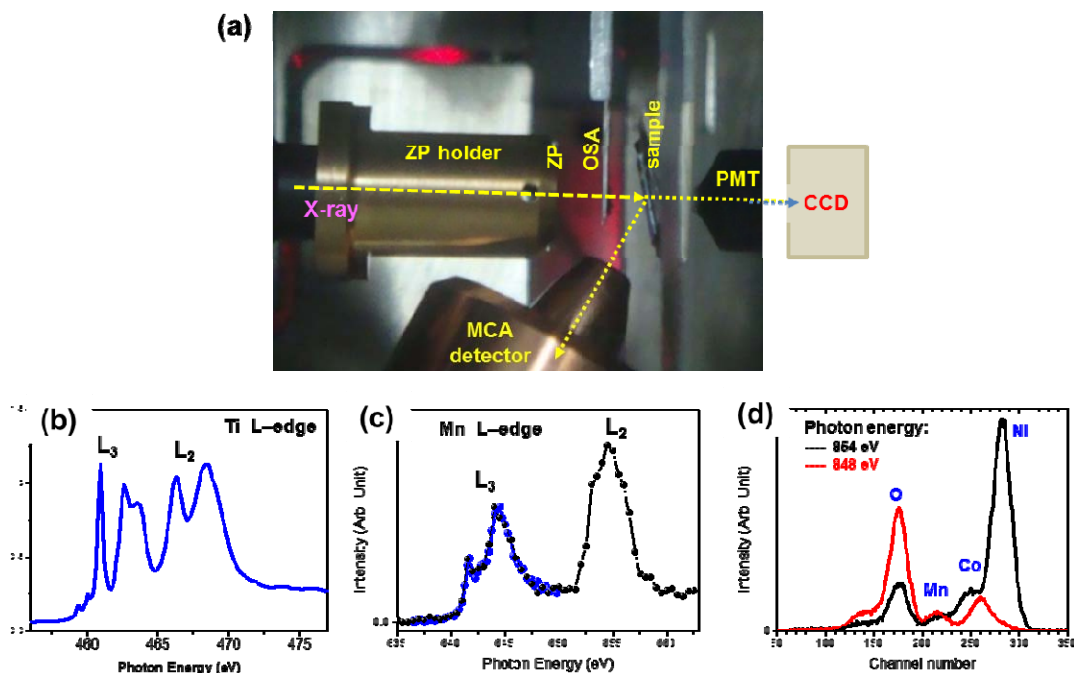


Fig. 1. (a) Photo of a PLS STXM setup. (b-c) XAFS spectra obtained from a Ti containing micron-size sample with PMT (b) and from a Mn containing micron-size sample with fluorescence yield (c). A fluorescence spectrum from a Mn, Co, Ni containing micron-size sample (d).