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The Photon Factory: Some XAFS studies and a message for Africa

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The Institute of Materials Structure Science is one of the institutes in KEK, and runs a synchrotron facility, Photon Factory (PF), where two synchrotron rings, PF and PF-AR (Advanced Ring) are operated. PF is operated with the beam energy of 2.5 GeV. PF-AR with 6.5 GeV or 5.0 GeV provides higher energy regions. There are about 50 end stations including 6 x-ray absorption fine structure (XAFS) beamlines: 9A, 9C, 12C, 15A1, NW2A and NW10A.

XAFS is one of the most demanded methods at synchrotrons and is applied to study a wide variety of materials such as catalysts, batteries, functional oxides, semiconductors, minerals and environmental samples. XAFS is usually divided into characteristic two regions, x-ray absorption near edge structure (XANES) and extended x-ray absorption fine structure (EXAFS). XANES is the region of the spectrum from just below the absorption edge to ~50-70 eV above the edge. EXAFS is the other higher energy region above XANES and analysed to investigate local structures of elements of interest. We will share a couple of XAFS studies performed at our facility. In addition, I would suggest potential topics to be studied at the AfLS in the context of natural resources in Africa and some issues.

Finally, I would like to share my story on the AfLS project. I have been involved in the AfLS project since 2015, when I met Prof. Herman Winick at an international conference held in New York. In the same year of 2015, the first AfLS conference was held at ESRF, Grenoble, France. Dr. Francesco Sette, Director General of ESRF, gave impressive words in his speech, "Science is Peace". A faculty and student team from the Botswana International University of Science & Technology (BIUST) visited us in 2017. They stayed for a month, performed XRD experiments, and published a paper very soon. We are happy to accept another team to learn and to perform synchrotron experiments.

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