



Contribution ID: 915 Contribution code: TUPA019

Type: **Poster Presentation**

Photoelectron spectroscopy of CsK₂Sb photocathode at Synchrotron Radiation Facility using vacuum transport system

Tuesday, 9 May 2023 16:30 (2 hours)

As accelerators and electron microscopes become more advancement, high-performance photocathodes are required. In particular, CsK₂Sb photocathode is of interest because of its low emittance, excitability in visible light, and high quantum efficiency (QE). On the other hand, it has drawbacks such as weak structure, limited operating vacuum pressure, and short lifetime with time or charge. To resolve these issues, it is necessary to understand the molecular structure of the cathode and its degradation mechanism. In this study, we transported CsK₂Sb photocathode to a beamline of synchrotron radiation facility using a vacuum transport system for surface analysis. Specifically, the cathode was deposited at the evaporation system at Nagoya University. We transported it to Aichi Synchrotron Radiation Center (Aichi SR) away from 15 km, and analyzed it in the depth direction by X-ray photoelectron spectroscopy (XPS) at BL7U. Based on the results, we quantitatively evaluated the composition ratios and stoichiometry of the cathode element (Sb, K, Cs). A Cs excess state was observed at the surface, and it is consistent with previous studies. It was observed that K was first desorbed among the three elements of cathode with sputtering. The cause is considered that weakest binding energy of K.

Funding Agency

This work is partly supported by Grants-in-Aid for Scientific Research (Grant-in-Aid for Young Scientists, 21K17994).

Footnotes

I have read and accept the Privacy Policy Statement

Yes

Primary authors: SHIOHARA, Keisuke (Nagoya University); GUO, Lei (Nagoya University)

Co-authors: YAMAGUCHI, Hisato (Los Alamos National Laboratory); TAKASHIMA, Yoshifumi (Aichi Synchrotron Radiation Center)

Presenter: GUO, Lei (Nagoya University)

Session Classification: Tuesday Poster Session

Track Classification: MC2: Photon Sources and Electron Accelerators: MC2.T02: Electron Sources