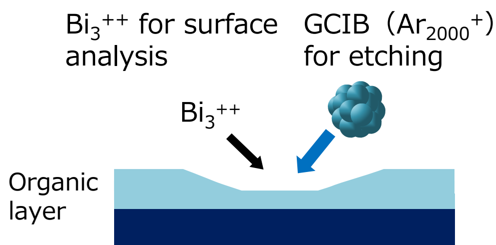
Depth profile analysis of SEI on anode by GCIB-TOF-SIMS

GCIB-TOF-SIMS provides us depth profile with chemical structural information of organic compounds. Depth distribution of organic compounds in SEI on electrode can be obtained. This method is useful for SEI evaluation.

Summary of GCIB-TOF-SIMS

Bi_3^{++} and GCIB are irradiated alternately

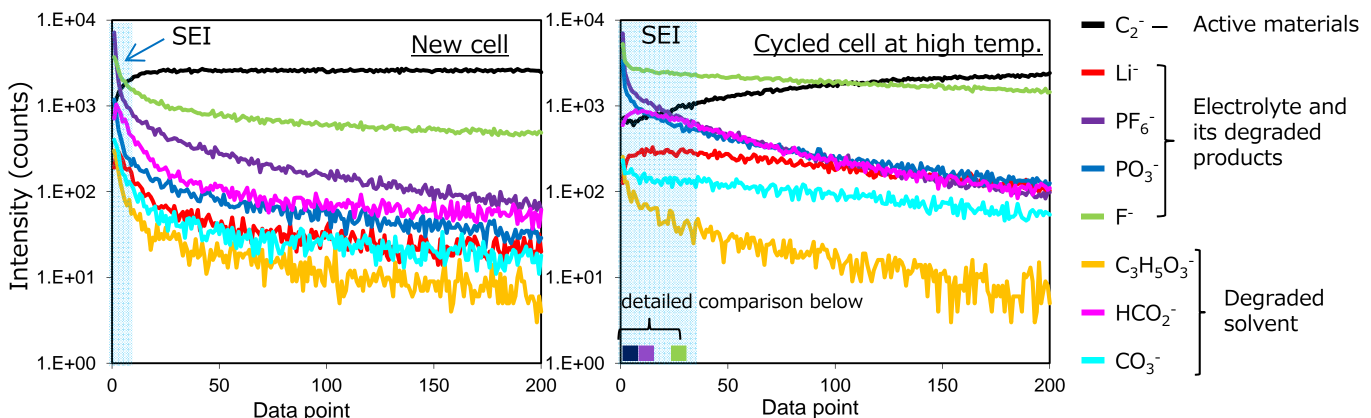


Features of GCIB (Gas Cluster Ion Beam)

Cluster size is large, so the kinetic energy per atom is small enough to reduce damage to organic compounds.

GCIB enables us to obtain depth profile of organic compounds.
⇒ Evaluation of organic compounds in SEI on anode

Comparison of depth profiles of SEI on anode of new cell and cycled cell at high temperature

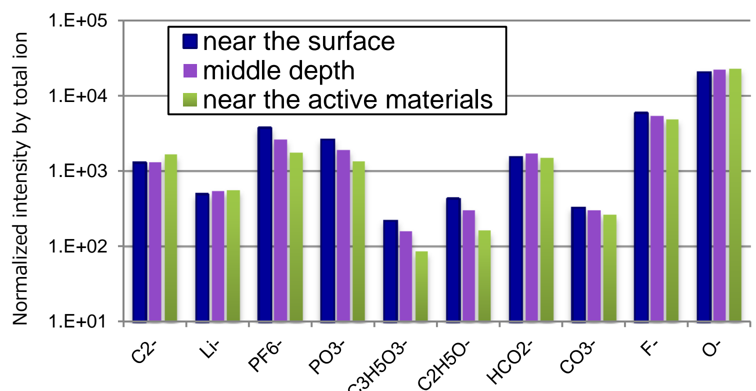


- Cycled cell has thicker SEI than new cell.
- Depth distributions of degraded solvent differ according to ion species in cycled cell .

Intensity comparison of components in cycled cell at each depth

Intensities of SEI components were compared at three different depth (■■■).

- Electrolyte (PF_6^-) and its degraded product (PO_3^-) are stronger near the surface and weaker near the active materials.
- The depth distributions of degraded solvent ($C_xH_yO_z^-$) differ according to ion species. HCO_2^- (formic acid) is strongest at the middle depth.



Qualitative analysis and depth profile analysis of SEI components on electrode can be achieved.