



INTERNATIONAL
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Owari Laboratory

[Three-Dimensional Atom Probe(3DAP)]

[High spatial resolution 3D analysis of element distribution using focused beams]

Institute of Industrial Science, Department of Material and Environmental Science

<http://www.owari.esc.u-tokyo.ac.jp/>

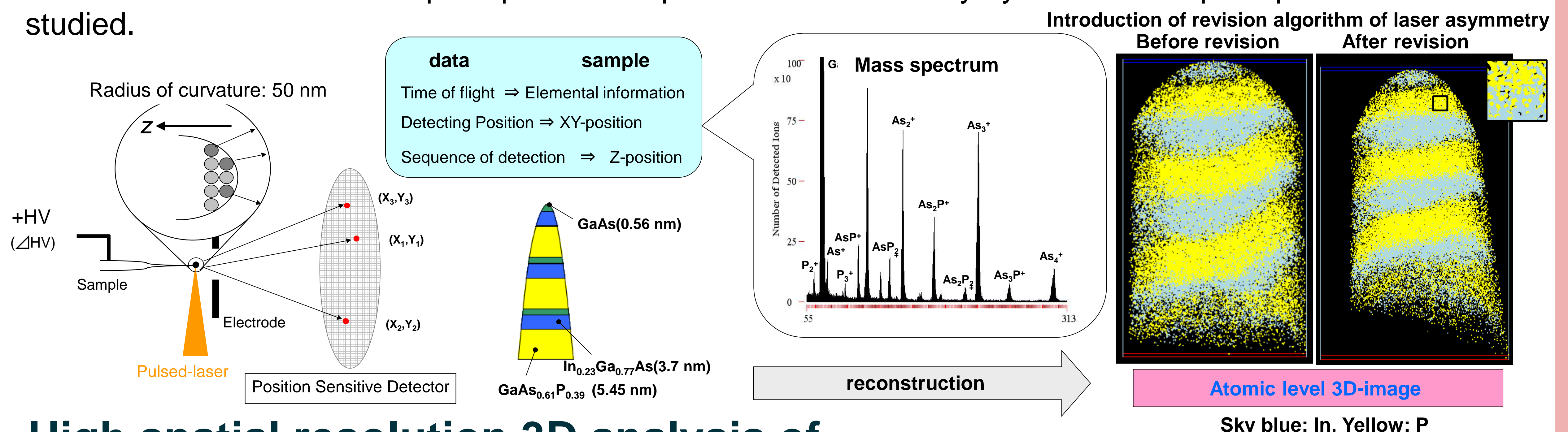
Research topic ● micro and nano material analytical chemistry

Department of Applied Chemistry

Three-Dimensional Atom Probe(3DAP)

Be-B05

Atom probe tomography enables the quantitative chemical analysis of nanostructured materials with a nearly atomic scale. By carefully controlled field evaporation, individual atoms are removed from a needle-shaped sample and their time of flight and detected positions are determined. The atoms are identified by mass spectrometry and their geometric origin within the specimen is also reconstructed. Currently, further clarification of measurement principles and improvement of reliability by utilization of principles are under studied.



High spatial resolution 3D analysis of element distribution using focused beams

Fe-408

FIB-SIMS(Focused Ion Beam Secondary Ion Mass Spectrometry)

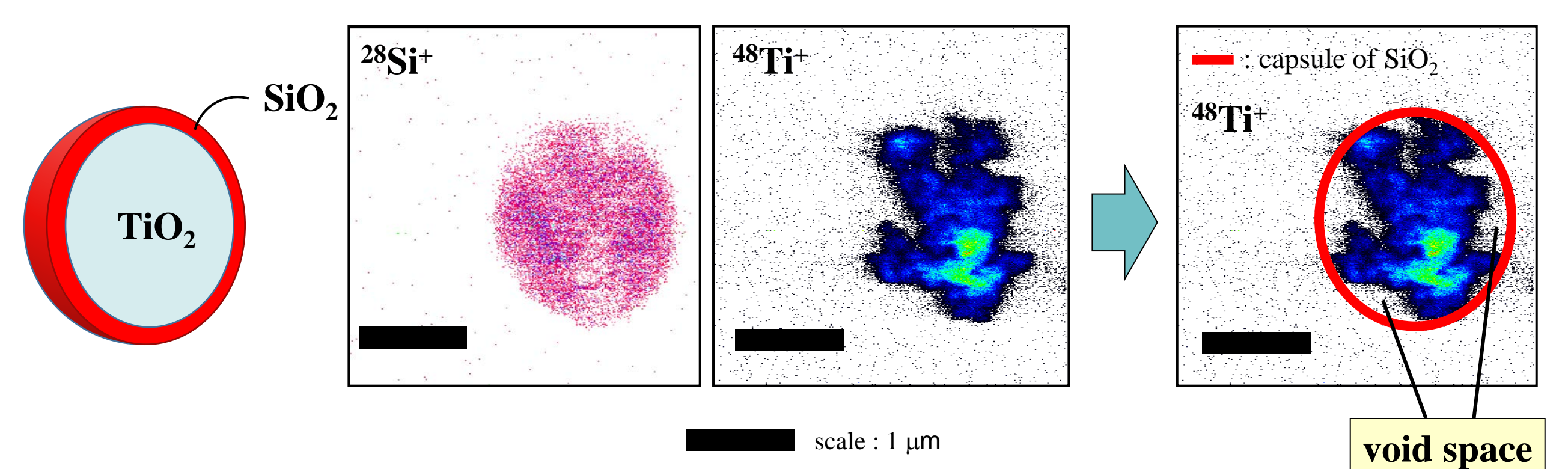
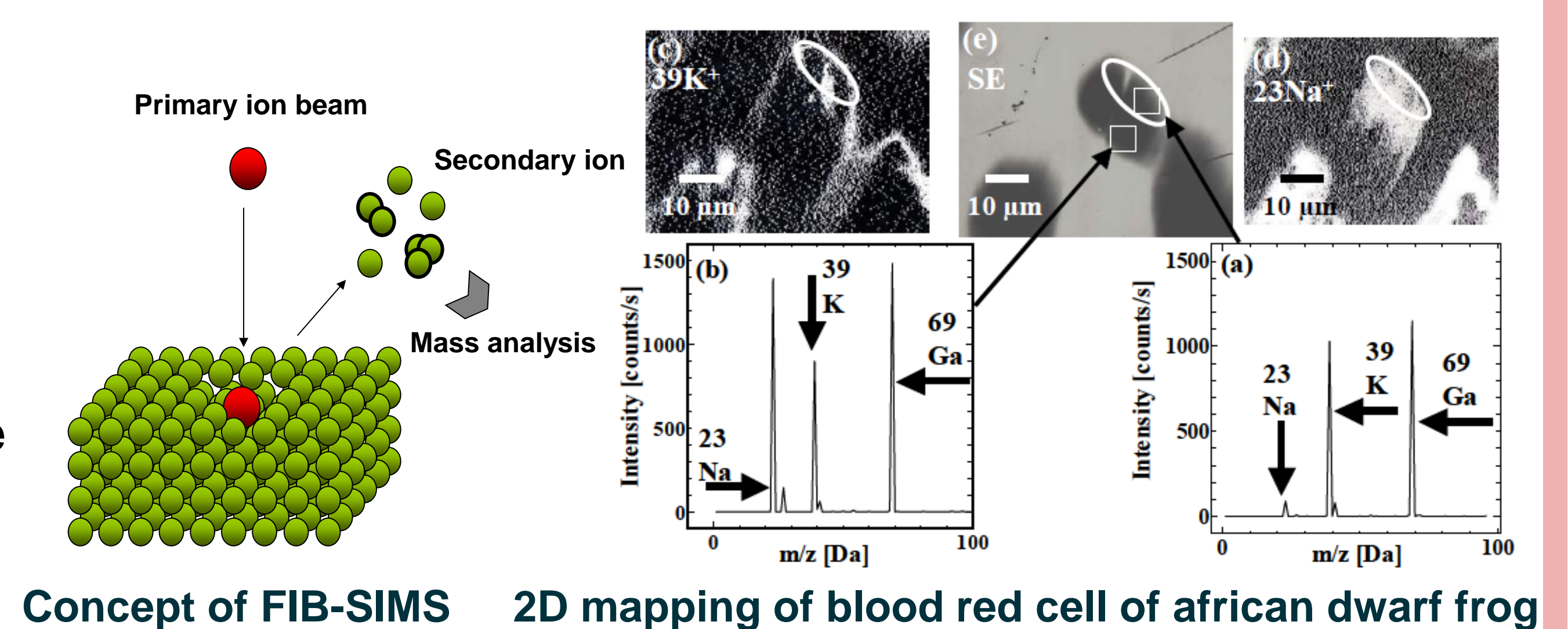
FIB-SIMS is one of surface analytical methods, which can obtain element distribution in micro region of sample by exposing Focused Ion Beam (≈ 50 nm in diameter). Two-dimensional information mapping of element distribution of sample surface can be obtained by scanning sample surface with focused ion beam.

Shave-off method

Shave-off is the scanning method of shaving sample off completely by scanning sample surface with edge of focused ion beam. Two-dimensional information mapping by shave-off method can realize higher spatial resolution (< 20 nm) than beam diameter (≈ 50 nm). Obtained ion intensity shows the element content in each point. Three-dimensional information mapping can also be obtained by two-dimensional scanning of sample surface with shave-off method.

Dual beam SIMS

Dual Beam SIMS is the three-dimensional analytical method by two beams located at a right angles. Three-dimensional information mapping of element distribution can be obtained by two-dimensional information mapping and sectioning with the two beams alternately.



2D shave-off measurement of a TiO_2 including SiO_2 micro capsule

