

Sample Results Summary Sheet

Please return this form to the Curator for each allocated Sample

Sample ID: RA-QD02-0056 (One among the four original samples for space weathering observation)

PI: Takaaki Noguchi

Type and date of analysis performed:

Potted butt: Scanning electron microscopy (SEM) at Ibaraki University on Feb. 16, 2011.

Ultrathin sections: Scanning transmission electron microscopy (STEM) at Hitachi

High-technologies Co., on Feb. 24 and Dec. 27, 2011.

Elements or phases identified: (Mg, Si, olivine, pyroxene, aromatic carbon, etc.)

Olivine, chlorapatite

Nano particles were not observed on the surface of olivine in ultrathin sections.

Very thin (~2 nm) surface layer was observed on the surface of olivine.

Contaminant phases identified: (Al, SUS, carbon particles, etc.)

Not detected.

Sample handling: (e.g. exposed in atmosphere, embedded in resin, polished, sliced by FIB or UMT)

Embedding in epoxy resin in N₂ purge environment at the curation facility, ISAS/JAXA on Jan. 18, 2011.

Transportation by using a N₂ purge box from ISAS/JAXA to Ibaraki University on Jan. 21, 2011.

Ultramicrotomy at Ibaraki University in an N₂ purge glove box on Feb. 2, 2011. The ultrathin sections on TEM grids were preserved in an N₂ purge glove box. Ultrathin sections on TEM grids and a potted butt were in an aluminum-coated plastic bag and the bag was sealed thermally.

Carbon coating of the potted butt at Ibaraki University on Feb. 15, 2011. The potted butt was preserved in a vacuum desiccator just after carbon coating.

After SEM observation, the potted butt was embedded again for further main stream analyses on Feb. 17, 2011. Then, it was polished manually during February. It was transferred to Kyushu University and then Hokkaido University. It was returned to Ibaraki University on Jun. 1, 2011. It was kept in a vacuum desiccator.

State of sample pre-analysis: (e.g. N₂ hold, atmosphere, resin embedded, polished section, UTS) (please describe treatments and/or modifications for the sample you have done before your analysis)

STEM observation: ultramicrotomed sections embedded in epoxy resin.

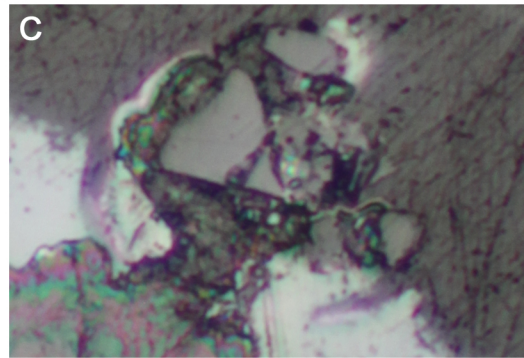
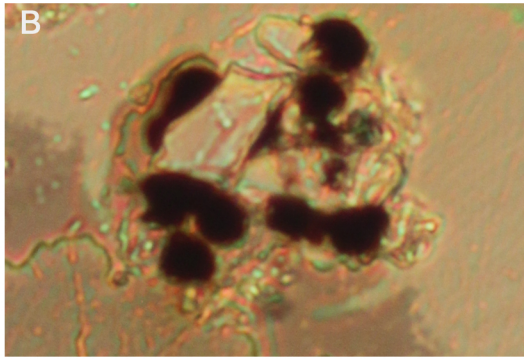
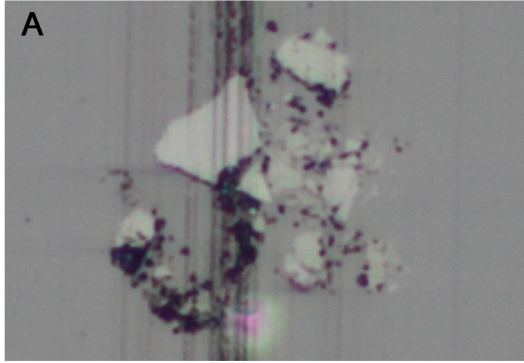
SEM observation: Carbon coated potted butt.

State of sample post-analysis:

All the ultrathin sections were preserved in a vacuum desiccator at Ibaraki University.

Analysis data Notes: (summary of the attached analysis data and/or images)

Please see the summary seat of this particle.



Sample handling history

1. Embedding in epoxy resin at ISAS/JAXA on Jan.18, 2011
2. Transport by using N₂ purge box on Jan. 21, 2011
3. Ultramicrotomy at Ibaraki Univ. on Feb. 13, 2011
4. Ultrathin sections: FE-STEM at Hitachi High-tech., on Feb. 24 and Dec. 27, 2011
5. Carbon coating of PB at Ibaraki Univ. on Feb. 15, 2011
6. Potted butt: SEM at Ibaraki Univ. on Feb. 16, 2011
7. Re-embedding of PB at Ibaraki Univ. on Feb. 17, 2011
8. Manual polishing at Ibaraki Univ. during Feb.

Processes No. 7 and 8 was performed in the earth's atmosphere, processes No. 1 to 3 were performed in N₂ atmosphere (<0.1% O₂, <-50 °C DT).

Samples (1) Potted butt: RA-QD02-0056, (2) Ultrathin sections: RA-QD02-0056-1 to 5

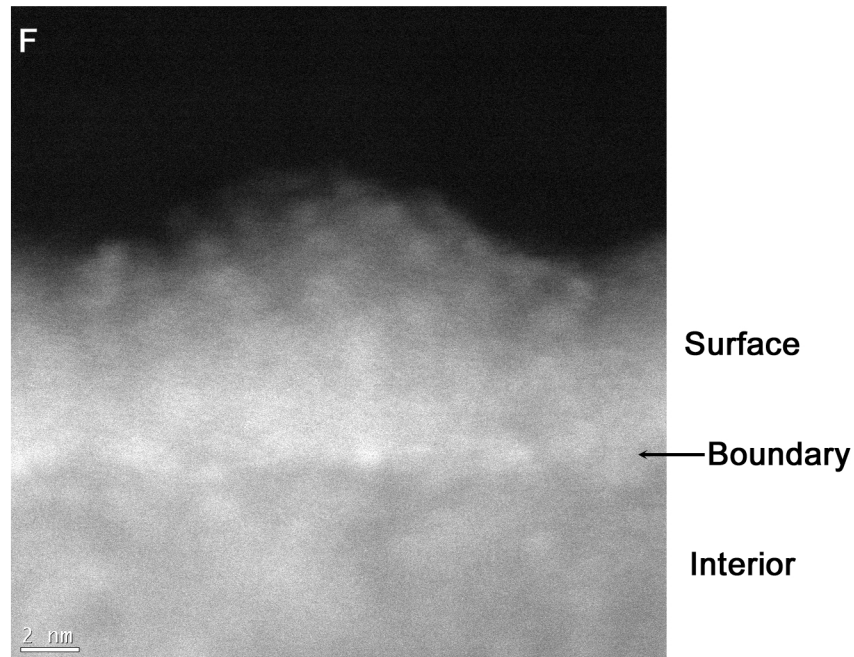
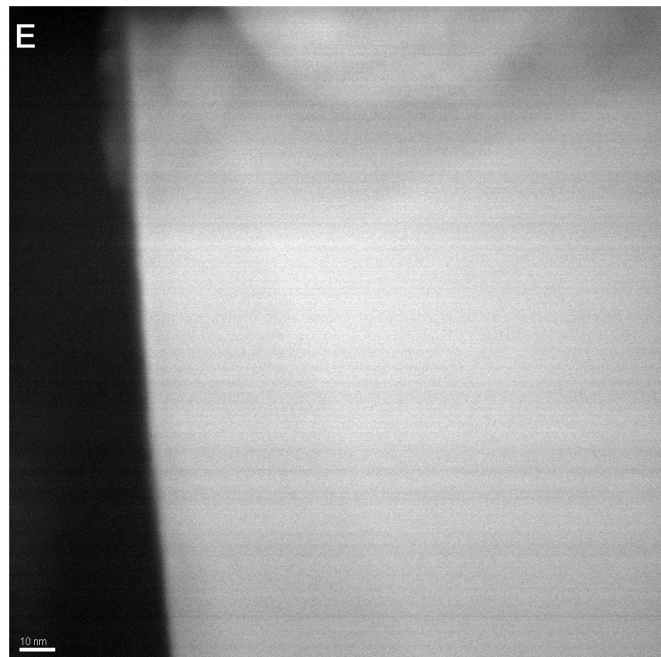
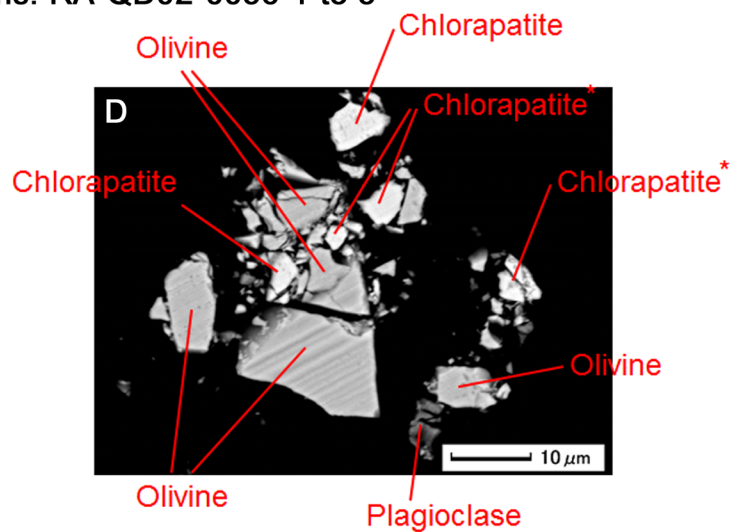


Figure A) Potted butt: Optical photomicrographs after UM (reflected light) (after 3), B) and C) Potted butt: Optical photomicrographs after manual polish (7).

D) BSE image of PB (6).

E) and F) HAADF-STEM images of the surfaces of olivine in RA-QD02-0056-4 (4).

There is no nanoparticle-bearing rim on this Itokawa dust particle. However, very thin (2-5 nm) surface layer was observed. At places, it seems to be miliary as shown in Figure F, in which the surface appears as a slope.