

Cometary Cell C2054

Track 25

Images

Aerogel Cell:

[C054-01.jpg](#)

[C2054,4_slab_post_cut.jpg](#)

[C2054,4_slab_pre_cut.jpg](#)

Track and Grains:

[CALCOMBONEW.jpg](#)

[cai_track.jpg](#)

Microtomed samples:

[C2054,4,25,1.pdf](#)

Track History:

Track flattened, embedded in acrylic, and microtomed by Brownlee, Joswiak and Matrajt..

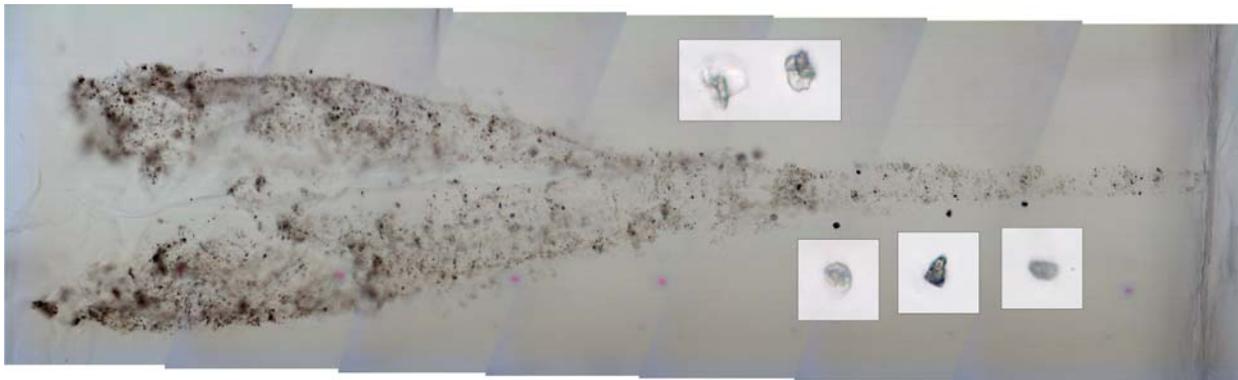
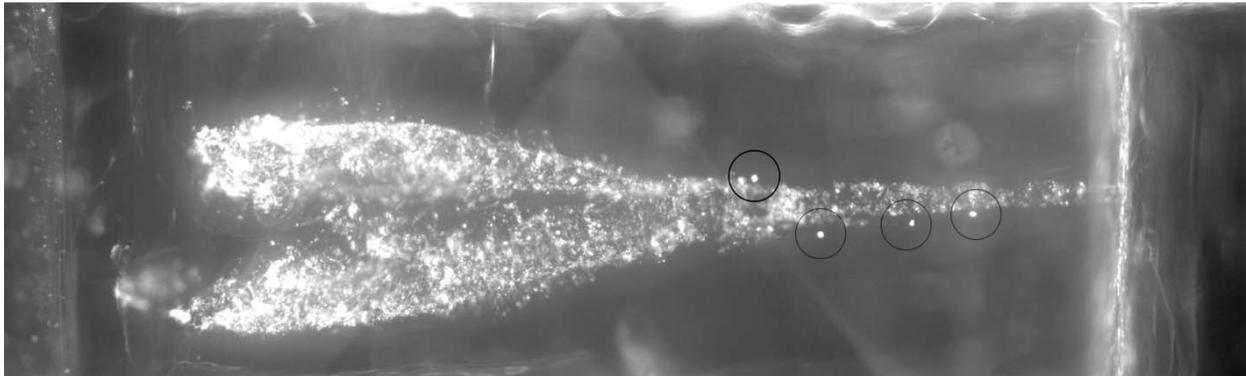
Track Characteristics:

Type: Turnip track grading into carrot track

Length: ~2mm

Grain diameters: Not measured

Allocation History



Results

Track and Grains:

Bradley, Ishii, Dai, Miaofang [STEM]: Diopside, Spinel, Glassy silicates with sulfide inclusions, V containing Osbornite, Sulfide on the rim, Anorthite, Gehlenite, possible Sapphirine.

Joswiak (TEM): reports analyses and identifications of many phases, including TiN, anorthite, Ti-Al rich diopside, melilite, spinel. Some identifications require verification.

S. Simon & L. Grossman (E-beam): Their samples were FeO- and alkali-free and completely composed of CMAST oxides, but it is certainly not a typical CAI like we are used to. Its bulk composition is 11.44 wt % MgO; 23.66 Al₂O₃; 48.95 SiO₂; 15.54 CaO; and 0.32 TiO₂. It is SiO₂-rich and CaO-poor compared to normal CAIs. It is not spinel-saturated, but if projected from spinel on the Stolper diagram (gehlenite-forsterite-anorthite ternary) it would plot near the An-Fo join, at about An₈₅Fo₁₅, with a negative gehlenite component. The TEM shows that all of the grains in the object look similar to each other, massive and featureless. They are crystalline, and three analysis spots have compositions consistent with aluminous diopside.

There is also a grain that is MgO- and TiO₂-free but does not have quite the right composition/stoichiometry for anorthite. Most (but not all) analysis spots did not have any detectable TiO₂. The thicker grains look dark in the TEM view and are bright in the SEM images.

One crystal of spinel, about one micron across. An analysis of it plots on a mixing line between pure MgAl₂O₄ and an analysis of the silicate host on all oxide-oxide plots. So, the object consists of the same oxides that typical CAIs do, and may have had typical CAI phases originally, but does not have a bulk composition or mineralogy like the CAIs we find in meteorites.

There is discussion back and forth between Steve Simon and Dave Joswiak regarding reduction of diopside (fassaite) analyses.

Data Files: Not available yet