Introduction

The purpose of this Annex is to add some figures that we opted to leave out of the regular paper.

Fig. EA-1. LAR04315,21 in crossed-nicols light. Mosaicized pastel-colored grains (the majority of this area) are olivines; finely porous orange- and grey-dominated grains are impact-smelted pigeonite. Blacks represent a mix of porosity, olivine domains at optical extinction, and opaque phases.
Fig. EA-2. LAR04315: BSE images showing context for Fig. 4’s BSE images of glass-rich areas. The felsic glasses occur as components of selvages that apparently formed as linings around large voids.
Fig. EA-3. “Blister” glass (arrow) with unusual intermediate Al content (~11.3 wt% Al₂O₃) near rim of an olivine of LAR04315-21. The large white grains are FeS, except near NW corner of the image, Fe-metal (and, tinged with grey splotches, Fe-oxide weathering product). This Fe-metal is especially Si-rich (2.2 wt%). The darkest grey phase that lines the overall elongate combination of voids, FeS and Fe-metal is Si-rich, Al-poor glass (roughly 90 wt% SiO₂ and 2 wt% Al₂O₃, based on crude EDS analyses).
Fig. EA-4. LAR04315 glass compositions.
Fig. EA-5. Compositions of Fe-metals in LAR04315 and the H109 portion of Almahata Sitta (AS).
Fig. EA-6. Compound grain of Fe-metal (white) and Cr-rich (6.3 wt%) Fe-sulfide (grey, with lamellae) in LAR04315,21. The Fe-metal contains 2.6 wt% Si.
Fig. EA-7. LAP03587,7 in crossed-nicols light. The meteorite consists mostly of olivine with a typical-ureilite proportion of opaques (mostly graphite) and minor pyroxene (two largest pyroxene grains indicated by “PX” and arrows). Image represents 10.8 × 9.3 mm.
Fig. EA-8. LAP03587,7 in reflected light, showing one of the larger (560 µm long) euhedral graphite laths. The adjacent olivine is reduced (dark) and sprinkled with tiny Fe-metals.
Fig. EA-9. BSE images of LAP05387,7. Top image shows several of the euhedral graphites. The adjacent olivine is reduced (dark) and sprinkled with tiny Fe-metals (cf. Fig. EA-7). Middle image shows an area of reduction products along the seam between two large olivines. Blocky 10-20 µm grains (closest to olivines, in shades of light to, more commonly, medium grey) are Fe-poor pyroxenes. Central anhedral mass of flat dark grey is felsic (mostly 18-19 wt% Al₂O₃, 3.6 wt% Na₂O, 6 wt% CaO) glass. The white ovoid grain near the southwest corner of the image is FeNi-metal. The small (<10 µm) extremely dark grey grains clustered within the felsic glass next to that Fe-metal are silica (at least 93 wt% SiO₂). Bottom image shows an area of extremely reduced olivine near the rim of one of the large original olivines. The assemblage here consists of ~10 µm somewhat rounded grains of Fo₉₃₋₉₄ olivine (dark grey) with smaller Fe-metals and an interstitial phase (light grey) that is glass whose composition is near to an Mg-rich augite (En₅₅Wo₃₉), but enriched in Al₂O₃ (7.3 wt%) and deficient in SiO₂ (49.6 wt%); cf. the areas of “olivine microporphry” in LAR04315 (Fig. 8).
Fig. EA-10. BSE image of Almahata Sitta, stone 27. Area shown (2.0 × 2.2 mm) is mostly olivine, which in this area, except in the left 1/3 of the image, is mostly reduced (darker shade of grey, sprinkled with tiny white Fe-metals). Large grain in the upper right corner, grain along middle-right lower edge of the image, and 0.7 × 0.3 mm ovoid within olivine, are pigeonites; optical-light study indicates that the top and bottom of these are a single large grain in optical continuity with one another (but the ovoid is not part of the optical continuity). Skinny arc-shaped white phase along olivine-pigeonite (and olivine-olivine) grain boundaries is Fe-metal.
Fig. EA-11. Transmitted light image of the studied thin section (loaned from John Kashuba) of the Haberer 109 sample of Almahata Sitta. Except along lower right edge (fusion crust), the dark splotches are domains of the distinctive LPS sublithology. Region shown in Fig. 16 is indicated near the upper right corner. Scale bar indicates 1 mm. Pastel shades are mostly camera artifacts.
Fig. EA-12. Pyroxene compositions [Takeda and Saito, 1990] from several other ureilites with “cloudy” appearing pyroxenes. Large black diamonds indicate the intact pyroxenes of LAR04315 (left) and LAP03587 (right).