

CAI

Backscattered electron images of melilite-rich inclusions from CO3 chondrites. (a) ALH77307 (3.0) SP16. This compact inclusion, $120 \times 90 \mu\text{m}$, is composed of multigranular melilite [Mel] ($\text{\AA}k9$) that encloses many irregular patches of spinel [Sp] ($\text{FeO} < 0.3 \text{ wt}\%$), that are up to $10 \mu\text{m}$ across. The inclusion is rimmed with anorthite [An] surrounded by diopside [Di]. A patch of the rim minerals, anorthite and diopside, in the center of the inclusion indicates that the CAI is irregularly shaped in the third dimension. (b) ALH82101 (3.3) SP1. The largest CAI identified (not, vert, similar 1 mm across), this inclusion is comprised of loosely aggregated melilite grains, many of which are rimmed with spinel and rarely with anorthite. (c) Close-up of the individual melilite crystals rimmed with spinel in ALH82101 SP1. (d) ALH77307 (3.0) SP7 is a compact, fractured $110 \times 60 \mu\text{m}$ inclusion consisting of melilite ($\text{\AA}k5$) surrounding irregularly-shaped spinel and two hibonite [Hib] laths. (e) Colony (3.0) C21. This is a $340 \times 230 \mu\text{m}$ CAI consisting of a core of melilite ($\text{\AA}k9-11$) that encloses irregular patches of iron-poor spinel ($\text{FeO} = 0.4 \text{ wt}\%$). The spinel becomes more abundant towards the inclusion rim. The entire inclusion is rimmed by a thin layer of fassaite ($\text{Al}_2\text{O}_3 = 22.6 \text{ wt}\%$) that grades outwards to diopside. Some outer portions of the inclusion are porous and consist of phyllosilicates, diopside, and minor FeS [Alt]. (f) Ormans (3.3) SP17 is a compact $270 \times 200 \mu\text{m}$ CAI composed of multi-granular melilite that encloses blocky spinel of variable iron composition and not, vert, similar $5 \mu\text{m}$ perovskite grains. The outer part of the inclusion has been partially altered to fine-grained, feldspathoid-rich material. The inclusion has a partial rim of diopside. The electron-probe traverse of spinels (Fig. 3) is shown by the dotted line.

