

### ALBITIC PLAGIOCLASE IN MICROMETEORITES FROM THE SOUTH POLE WATER WELL, ANTARCTICA

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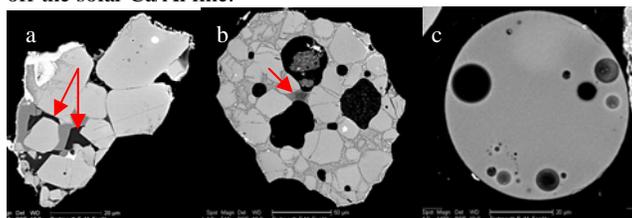
**Introduction:** Micrometeorites (MM) make up most of the extraterrestrial (ET) flux landing on the present day Earth [1]. Many of these small particles are compositionally similar to carbonaceous chondrites (CC) and unlike ordinary chondrites (OC), the most common meteorite type [2]. Reasons for the compositional difference of these two size classes of ET materials include underestimates of the OC component in MM collections [3] or biases that favor the preservation of meteorites with OC compositions [4].

Albitic plagioclase is a very common mineral in OC but rare in CC meteorites [3]. Here we use Na containing plagioclase relicts as a measure of the OC component and quantified the number of MM containing plagioclase in the flux calibrated 1995 South Pole water well (SPWW) collection [5].

**Sample Description and Analysis:** Micrometeorites studied here come from 1995 SPWW plateau sample [5]. We examined 654 MMs previously imaged with the SEM at Dartmouth College and analyzed five MM in detail using the electron microprobe at Rutgers University.

**Discussion:** Unmelted plagioclase-bearing MM have interlocking olivine, pyroxene and plagioclase phenocrysts (Fig. 1a). After partial melting equal sized olivine or pyroxene relicts remain in a feldspathic glass (Fig. 1b). These MMs are not spherical, have non-spherical vesicles and often contain chromites. Complete melting produces glass spherules that can have a range of compositions depending on the relative proportion of the phases in the micrometeoroid. Shown in Fig. 1c is a melted Na-bearing plagioclase MM.

Thirteen of the 654 MMs examined (2%) contained plagioclase relicts (dark phases indicated by red arrows) or feldspathic glass. This value is a lower limit for the flux as we only tallied easily identified unmelted or partially melted plagioclase-bearing MMs. Of the five MM analyzed two had plagioclase and olivine relicts (Ab 57, An 43 Fo 64 and Ab 86, An 14, Fo 72), two had relict olivines (Fo 70 and 77) and 1-2% Na in the glass and one had pyroxene relicts (En 85) with 1% Na in the glass. These values are very similar to the bulk Na<sub>2</sub>O content of OCs [6] and higher than the expected Na contents of CC. When totally melted, OC glass spherules may differ from those formed from melting CC materials by having higher Ca and Al concentrations and plotting off the solar Ca/Al line.



**Figure 1.** Textures of feldspar-bearing MMs (red arrows=feldspars).

**References:** [1] Love S.G. and Brownlee D.E., (1993) *Science* **262**, 550-553. [2] Brearley & Jones (1998) *Rev. Min.* **36**, 3-1 - 3-398. Genge M. J. (2008) *Geology* **36**, 687-690. [4] Sears D.W.G. (1998) *Astrophysical Journal*, 498, 773-778. [5] Taylor et al. (1998) *Nature*, 392, 899-903. [6] Jarosewich (1990) *Meteoritics* **25**, 323-337.