**THE PARENT LIQUID OF EET79001, LITHOLOGY B**.
J.H. Jones[1] and S.J. Arauza[2]. [1]KR, NASA/JSC, Houston, TX 77058 (john.h.jones@nasa.gov); [2]Dept. of Earth Science, University of California, Santa Barbara, 1006 Webb Hall MC 9630, Santa Barbara, CA, 93106.

EET79001 is a martian meteorite that contains two basaltic lithologies, A and B. Lith A is fine-grained and contains xenolithic material. Lith B is coarser grained and is more evolved compositionally. In terms of major mineralogy, Lith B is a pigeonite-augite-plagioclase basalt, or micro-gabbro.

There is some confusion as to the actual composition of Lith B, probably because some allocations of "Lith B" were actually taken from the contact zone between Lith A and Lith B [1]. For our purposes here, we select Lith B analyses that have the lowest concentrations of highly siderophile elements as being most representative of Lith B [1,2,3]. It may be that only the samples analyzed by [2,3] are compatible with this definition. Warren and Kallemeyn [2] analyzed Lith B samples that had very low MgO (~5.3 wt.%) contents and extremely low Os and Ir concentrations (3-6 ppt Os). Walker et al. [3] analyzed a sample specifically selected by D. Mittlefehldt as *bona fide* Lith B and found that the Os in that sample was below their detection limit. Previously, Brandon et al. [4], using analytical methods similar to those of [3], had reported an Os concentration for Lith B of 160 ppt. Our interpretation is that both Walker et al. [3] and Warren and Kallemeyn [2] sampled pure Lith B whereas most other samples that have been advertised as Lith B are actually mixtures of B and A.

Arauza et al. [5] performed experiments to determine whether Lith B might be a true liquid, devoid of cumulus materials. They used the analyses of [2] for making a starting composition. Of the various compositional choices available to Arauza et al., Warren and Kallemeyn's was the least mafic. Additionally, using experiments from [6,7] to construct a shergottite phase diagram, Arauza et al. found that the Lith B composition of [2] plotted very close to the minimum melting point of the EN-WO-PL pseudo-ternary, but nominally within the plagioclase field.

Experimental liquidus phases were plagioclase and augite, with a liquidus temperature of ~1125°C [5]. At 1110°C olivine joined the crystalline assemblage [5]. The lack of pigeonite and the presence of olivine strongly suggested to Arauza et al. that Lith B was not a true liquid, since olivine is not present in Lith B but pigeonite is [5]. Experimental augites were slightly more FeO-rich than natural Lith B augites and the experimental plagioclases were slightly more calcic than those in Lith B.

These experimental observations suggest that the parent of Lith B was an augite-pigeonite saturated liquid that, upon reaching the EN-WO-PL minimum began to crystallize plagioclase and accumulated plagioclase preferentially. The net result of this slight accumulation was to enrich Lith B in Ca. This interpretation could account for most of the experimental results of [5]: (i) experimental plagioclase is more calcic than in Lith B; (ii) low-Ca pyroxene is destabilized with respect to high-Ca pyroxene; and (iii) experimental augites crystallize at a lower temperature than natural Lith B augites and, thus, are more ferroan.

**References:** [1] Jones J.H. et al. (2003) *Chem Geol.* **196**, 12-41. [2] Warren P.H. et al. (1999) *GCA* **63**, 2105-2122. [3] Walker R.J. et al. (2002) *Lunar Planet. Sci. XXXIII*, #1042. [4] Brandon A.D., et al. (2000) *GCA* **64**, 4083-4095. [5] Arauza et al. (2010) *Lunar Planet. Sci. XXXXI,* #1429. [6] Stolper E. M. and McSween H.Y., Jr. (1979) *GCA*, **43**, 1475-1498. [7] Wasylenki L.E. et al. (1993) *Lunar Planet Sci. XXIV*, 1491-1492.