cBSM: A bulk silicate Moon model enriched in crustal-component

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We propose a crustal-component-enriched bulk silicate Moon model (cBSM) for the source of the host magmas of ferroan anorthosites (FAN-host magma). The source must have had primordial sub-chondritic Sr/Ba, Ti/Ba and Sr/Al ratios, which was estimated from SIMS analyses of plagioclase in lunar highland rocks [1, 2, 3].

For a recommended cBSM model, the proto-bodies of the Moon–Earth system had bulk silicate compositions that were initially enriched in volatiles to **3** times that of the bulk silicate Earth. Proto-crusts formed on these proto-bodies by **5**% partial melting under low-pressure conditions at which Ca-rich clinopyroxene and Na-rich plagioclase are stable in the mantle. During the last giant impact, the cBSM was formed by volatile loss and mixing of the proto-bodies with their evolved proto-crusts (**10**%) through heterogeneous accretion. This is referred to as cBSM (3-5-10).

The magmas that evolved from the cBSM(3-5-10) through a polybaric two-step process had sub-chondritic Sr/Ba, Ti/Ba, Ca/Al, Ti/Th, and Yb/La ratios, consistent with those of FAN-host magma, and also with the estimated host mafic magma for feldspathic crust from lunar meteorites [4].

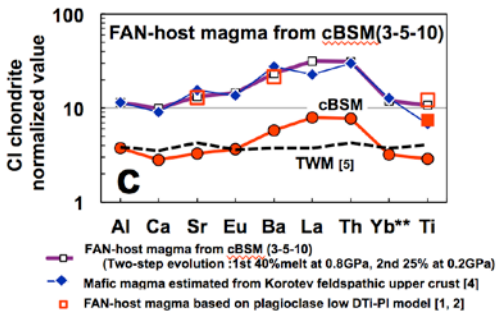

Figure 1: C1 chondrite normalized values of refractory elements for the FAN-host magmas from cBSM(3-5-10).

[1] Togashi *et al*. (2011) *MinMag* **75**, 2017. [2] Togashi *et al*. (2013) *44th LPSC*, #1719. [3] Togashi (2014) *45th LPSC*, #1777. [4] Korotev *et al*. (2003) *GCA* **67**, 4895-4923. [5] Taylor Whole Moon, Taylor(1982) *Planetary science*.