

## **Compositional constraints on the launch pairing of three brecciated lunar meteorites of basaltic composition**

*Randy L. Korotev, Bradley L. Jolliff, Ryan A. Zeigler, and Larry A. Haskin*

**Abstract:** Lunar meteorite EET 87/96 (paired stones Elephant Moraine 87521 and 96008) is a breccia consisting of fragments of a solidified, differentiated magma of basaltic composition. Small splits of the meteorite vary considerably in composition because they are heterogeneous mixtures of (1) a low-FeO differentiate with high Mg/Fe, high Cr/Sc, high Ca/Na, and low concentrations of incompatible elements and (2) a high-FeO differentiate with complimentary geochemical characteristics. Y79/98 (paired stones 793274 and 981031) and QUE (Queen Alexandra Range) 94281 are regolith breccias consisting of subequal proportions of material from the feldspathic highlands and fragments of mafic volcanic rock of mare-basalt-like composition. Previous studies have shown that (1) QUE 94281 and Y79/98 are very similar to each other and likely derive from the same source crater, (2) the texture and mineralogy of the volcanic components of all three meteorites are similar to each other yet distinct from mare basalts of the Apollo collection, and (3) all three meteorites were launched from the Moon at about the same time. We show that the volcanic component of Y79/98 and QUE 94281 are compositionally indistinguishable from a point on the EET 87/96 mixing line. Thus, there is no compositional impediment to the hypothesis that all three meteorites originate from the same place on the Moon and were launched by a single impact.