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Further evidence for a ~4.2 Ga age component in Apollo 16 impact melt rocks?

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Most mafic KREEP-rich impact melt rocks from the Apollo 16 landing site likely formed during the ~3.9 Ga Imbrium event [e.g., 1]. Some of the less KREEP-enriched and more aluminous A16 melt rocks may also derive from the same event [2], but their compositional variety suggests contributions from non-Imbrium events as well. A sample that might represent such a non-Imbrium event is 61156 [3, 4]. We are currently dating this sample using several isotopic systems (Lu-Hf, Sm-Nd, Rb-Sr, and U-Pb). As the sample has been strongly affected by neutron capture ($\mu^{180}\text{Hf} = -425$), we corrected for the resulting effects using the model of [7, 8]. The $^{176}\text{Lu}/^{177}\text{Hf}$ range among mineral fractions is 0.009-0.034, but no statistically valid Lu-Hf isochron was obtained. Using 4 of the 7 mineral fractions, however, yields an errorchron of 4.25 ± 0.10 Ga (MSWD = 3.7). If corroborated by our future results from other isotopic systems, this date would help to more clearly define the ~4.2 Ga event(s) recorded by aluminous Apollo 16 impact melt rocks [7, 8].

[1] Haskin, L.A. et al. (1998) MAPS 33, 959–975. [2] Korotev, R.L. (1994) GCA 58, 3931–3969. [3] Norman, M.D. et al. (2006) GCA 70, 6032–6049. [4] Tera, F. et al. (1974) EPSL 22, 1–21. [5] Sprung et al. (2010) EPSL 295, 1–11. [6] Sprung et al. (2013) EPSL 380, 77–87. [7] Fernandes, V.A et al. (2013) MAPS 48, 241–269. [8] Norman, M.D. et al. (2016) GCA 172, 410–429.

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