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# Siderophile elements in lunar granulitic impactites – Constraints on pre 4 Ga late accretion.

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Siderophile elements in lunar impactites provide a valuable record of late accreted materials and crustal reworking processes. Most highly siderophile element (HSE) data so far have been acquired from ~3.9 Ga old mafic impact melt breccias which are prevalent in the Apollo collection. However, their lithophile trace element characteristics restricts their formation to the Procellarum KREEP terrane (PKT). In contrast, feldspathic granulitic impactites are KREEP-poor and display recrystallization ages >4 Ga. Hence, their siderophile element inventories record earlier impacts, which either occurred outside the PKT, or before the lunar crustal dichotomy has formed. Relative HSE abundances in granulitic impactites from the Apollo 16 and 17 landing site are similar and strongly suggest accretion of volatile-depleted impactor material (possibly volatile depleted carbonaceous chondrite or primitive achondrite-like). On the other hand, siderophile volatile element ratios are more variable and reveal post-impact redistribution processes like depletion and redeposition due to interaction with volatile metal enriched vapor.

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