

Stable Cr isotopic compositions of Chang'E-6 clasts: implication for the Cr isotopic composition of bulk silicate moon

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Controversy remains over whether the bulk silicate moon (BSM) has the same Cr isotopic composition as the bulk silicate Earth (BSE) [1, 2]. Samples from lunar farside have been successfully returned by the Chang'E-6 (CE-6) mission. These samples comprise diverse lithic fragments, which provide valuable insights into the farside magmatic processes [3]. In this study, we analyzed the stable Cr isotopic compositions of two low-Ti basalt clasts and two KREEP basalt clasts from CE-6 samples, aiming to compare the Cr isotopic evolution during magmatic processes between lunar farside and nearside, and to reevaluate the Cr isotopic composition of BSM.

Our results reveal that the two low-Ti basalt clasts exhibit lighter Cr isotopic compositions relative to the two KREEP basalt clasts. This difference reflects the combined effects of magmatic processes and mantle heterogeneity. After accounting for the effects of fractional crystallization and partial melting, these results could help refine the Cr isotopic compositions of BSM.

References: [1] Sossi, P. et al. (2018) *PNAS* 115(43), 10920-10925. [2] Shen, J. et al. (2020) *GCA* 278, 289-304. [3] Li, C. et al. (2024) *NSR* 11(11), nwae328.