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A common initial $^{176}Hf/^{177}Hf$ of the Earth-Moon system and chondrites

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Defining the $^{176}Hf/^{177}Hf$ evolution of the bulk silicate Earth (BSE) is crucial for investigating terrestrial silicate differentiation using the ^{176}Lu-^{176}Hf system. Recently, an initial $^{176}Hf/^{177}Hf$ of the BSE ~4 ε-units below the traditionally assumed initial value of chondrites was proposed [1], suggesting that significant fractions of ^{176}Lu in chondrites underwent irradiation-induced, accelerated decay creating excess-^{176}Hf in chondrites but not in the BSE. To investigate this issue, we have obtained combined Lu-Hf and Sm-Nd systematics for KREEP-rich lunar samples [2]. We show that using the proposed low initial $^{176}Hf/^{177}Hf$ of the BSE [1] yields an unrealistically young Lu-Hf model age for KREEP, which is inconsistent with the Sm-Nd model age obtained for the same samples. In contrast, using chondritic reference parameters for the Moon yields concordant Lu-Hf and Sm-Nd model ages of *ca*. 4.37 Ga, and the expected subchondritic initial $^{176}Hf/^{177}Hf$ for KREEP. Thus, the Earth-Moon system and chondrites either hold excess-^{176}Hf at identical levels or, more likely, none at all.

[1] Bizzarro, M. et al. (2013) G3 13, Q03002. [2] Sprung, P. et al. (2013) EPSL 380, 77–78.

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