

## **Hafnium isotope evidence for the existence of the ultra-depleted Hadean mantle domains**

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Studies using a range of isotopic systems (Sm–Nd, Lu–Hf) on Archean mantle-derived (basaltic) rocks have identified ultra-depleted Hadean mantle reservoirs. Mantle depletion may be tracked using hafnium isotopes in zircon, which are difficult to modify by subsequent metamorphism. Although some have argued for a depleted mantle in the Hadean based on Hf in zircon, others have argued that such signatures do not start appearing until c. 3.8 Ga. We use simultaneous laser ablation split-stream (LASS) analysis of U–Pb and Lu–Hf isotopic compositions in detrital Hadean to Paleoproterozoic (c. 4.4–3.2 Ga) zircon grains from the Jack Hills in Western Australia. After filtering the data to exclude the effects of potential subsequent modification, we identify apparently primary Hadean to Eoarchean aged zircon components with eHf values as high as +13. Although future work is required to substantiate these claims, the data are consistent with highly-depleted mantle domains at this time, although their volume and spatial extent is unclear.