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Hf-W chronometry of ureilites

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Ureilites are ultramafic achondrites representing mantle residues of a partially melted, carbon-rich parent body (UPB). To investigate the timing of UPB differentiation we applied the Hf-W chronometer to ureilites and present here our first results. All ureilites investigated so far have similar $^{182}W/^{184}W$, corresponding to two-stage model ages of ~6 Ma after CAI formation and suggesting that differentiation of the UPB postdated core formation in iron meteorite parent bodies by several Ma. The new Hf-W age differs from a previously reported age of ~1-2 Ma [1], but is in good agreement with Mn-Cr and Al-Mg ages of ~5 Ma for feldspathic clasts in polymict ureilites [2]. We note, however, that ureilites may carry small nucleosynthetic W isotope heterogeneities on the order of ~10 ppm, which would significantly affect $^{182}W/^{184}W$ and, hence, the calculated ages. Moreover, ureilites may contain different generations of metal [3]. To address these issues, we are in the process of obtaining Hf-W data for additional ureilites, combined with an assessment of their HSE budgets.

[1] Lee et al. (2009) EPSL 288, 611–618. [2] Goodrich et al. (2010) EPSL 295, 531–540. [3] Rankenburg et al. (2008) GCA 72, 4642–4659.

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