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Flux digestions for Hf-W analysis by MC-ICPMS

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Chondrites contain variable proportions of diverse refractory components such as presolar grains, CAI, and even rare zircon that are difficult to dissolve completely before chemical and isotopic analysis. Dissolutions are typically done with HF-HNO₃-HClO₄ on hotplates or in high-pressure autoclaves. The latter are avoided for W work because W can leach out of PFA digestion vials out at elevated pressure, causing excessive blanks [1]. On the other hand, ambient-pressure hotplate digestions may not fully dissolve refractory and potentially Hf-rich minerals. To achieve complete and representative digestions of chondrites and their components for Hf-W analyses, we are evaluating different fusion methods. Possibilities include high temperature fluxing in graphite crucibles, or CO₂-laser melting coupled with aerodynamic levitation [2], but it may be difficult to achieve sufficiently low W blanks with the former. More promising is a low temperature (ca. 230°C) fusion at the KOH-NaOH eutectic carried out in Teflon vials. We are currently testing the efficacy of this method for complete dissolution of refractory components.

[1] Kleine et al. (2002) Nature 418, 952–955. [2]

+ Pack et al (2010). Geochem. Trans. 11, 4–16.

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