**53Mn-53Cr Systematics of Kaidun Dolomites.**

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**Introduction:** The Kaidun meteorite has been described as a complex polymict breccia. It contains clasts spanning a wide range of achondrite and chondrite groups [1]. The chondritic lithologies all contain carbonates, derived from aqueous alteration. In this work, we used a NanoSims to characterize 53Mn-53Cr internal isochrons on 3 individual dolomite grains in Kaidun in order to confirm the first and only 53Mn-53Cr chronological study of Kaidun carbonates from Hutcheon et al. [2].

**Experimental methods and samples:** Experimental methods are described in [3]. The 3 analysed carbonate grains are fine-grained and have diameters ranging from 20 to 70 μm. They occur as isolated matrix grains, without any association with other phases. The MgO content of these dolomites range from 16.0 to 20.9 wt% and their CaO content can reach 31.1 wt%. They contain significant amounts of iron (between 5.7 and 8.2 wt% FeO) and minor amounts of MnO (below 1.9 wt%).

**Results:** All 3 carbonates investigated show large enrichments in 53Cr with δ53Cr up to ~600‰. Their respective 54Mn/53Cr ratios are linearly correlated with δ53Cr constituting strong evidence for in situ 53Mn decay. A best-fit line forced through the origin yields a slope corresponding to initial 53Mn/55Mn ratios at the time of carbonate formation ranging from (4.27 ± 0.43) × 10⁻⁶ to (5.96 ± 1.05) × 10⁻⁶.

**Discussion:** The average initial 53Mn/55Mn ratio, (5.0 ± 1.0) × 10⁻⁶ from this study differs significantly from the value obtained by [2]. This discrepancy might represent sampling of different clasts and parts of Kaidun. The isochron from [2] compiles measurements from 3 different lithologies and 2 different carbonate types (calcite and dolomite). The internal isochrons presented here extend the range of already published 53Mn/55Mn initial ratios for the Kaidun carbonates.

**Conclusions:** The identical initial 53Mn/55Mn ratios found for the three 3 analysed dolomite grain diverge from the previous data analysed by [2]. These dolomite grains formed very early from within the first Myr to ~4 Myr after start of the solar system, assuming an initial 53Mn/55Mn of (8.5± 1.2) × 10⁻⁶ [4, 5] and an homogenous distribution of 53Mn (see [6] for another view). These results are similar to previous 53Mn-53Cr data from CI [3] and CM carbonaceous chondrites [e.g. 7], suggesting that the formation of dolomites and thus aqueous processing initiated very early in the solar system for these two classes of carbonaceous chondrites.