RE-EVALUATION OF ANOMALOUS METAL-RICH LODRANITE NORTHWEST AFRICA 468 BASED ON COMBINED CHROMIUM AND OXYGEN ISOTOPES.

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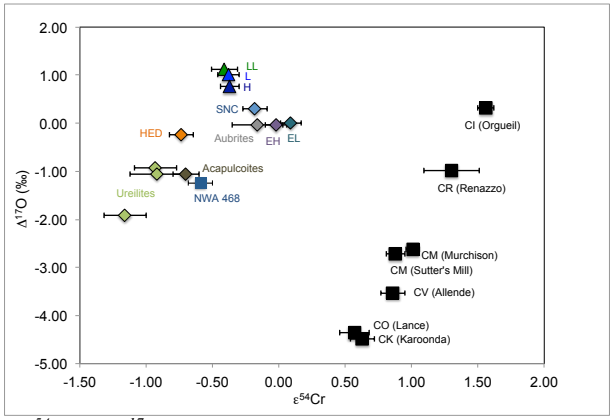
Northwest Africa (NWA) 468 is a 6.1 kilogram metal-rich achondrite acquired in 2000 by Dr. David Gregory, and the main mass is archived at the Royal Ontario Museum (ROM). Studies by [1] interpreted this specimen as a silicated ungrouped IAB iron, although affinities to lodranites were also suggested. We recently proposed [2] that this specimen might represent a metal-rich portion of the differentiated CR chondrite parent body based upon the similarities in oxygen isotopic composition. To further investigate this sample, high-precision Cr isotopic measurements were made on the silicate portion of the ROM specimen.

Petrography: Petrographic and microprobe analyses confirm the findings of [1] that the silicate portion of NWA 468 is an assemblage of coarse grained (1.5-7 mm), exsolved magnesian clinopyroxene with minor forsteritic olivine ($Fa_{6.7\text{-}8.9}$; FeO/MnO = 16-21), troilite and kamacite. Pyroxene grains consist of diopside ($Fs_{3.4\text{-}3.6}Wo_{45.1\text{-}44.8}$; FeO/MnO = 8) with blebby to lamellar exsolution lamellae of enstatite ($Fs_{8.8\text{-}9.0}Wo_{1.8\text{-}1.7}$; FeO/MnO = 12). The overall texture resembles that of a plutonic igneous (possibly cumulate) rock, but we disagree with the inference [1] that this specimen necessarily is the product of impact melting processes.

Chromium Isotopes: High-precision Cr isotopic analyses were made at UC Davis utilizing methods described in [3]. The parts per 10,000 deviation in $^{54}Cr/^{52}Cr$ from the accepted value for a terrestrial standard (i.e., $\varepsilon^{54}Cr$) is -0.59 ± 0.09. This value (in combination with the previously determined $\Delta^{17}O$ [2]) places NWA 468 within the same field as acapulcoites and lodranites on a $\varepsilon^{54}Cr$ vs. $\Delta^{17}O$ plot, ruling out a relationship to CR chondrites. Instead, the Cr isotopic results provide further evidence for the interpretation of NWA 468 as an anomalous metal-rich lodranite



$\varepsilon^{54}Cr$ vs. $\Delta^{17}O$ correlation plot for selected chondrites and achondrites. Data from [3, references therein].

References: [1] Rubin A. et al. 2002 *GCA* 66:3657-3671. [2] Irving A. J. et al. 2014 *LPS XLV*, A2465 [3] Sanborn M. E. et al. 2014 *LPS XLV*, A2032.