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^{54}Cr vs ^{17}O anomalies in the solar system: a two-reservoir model?

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With the higher precision of the last few years bulk carbonaceous chondrites display clearly resolved and variable ^{54}Cr excesses relative to the Earth composition which range from 0.62 to 1.56ε(deviations in 10 $^{-4}$from the terrestrial standards) in agreement for CI and CV values with (Shukolyukov *et al.*, 2003). High precision static multicollector measurements are able to resolve even smaller differences with a precision up to ca 10 ppm for ^{54}Cr/^{52}Cr. Following the discovery of anomalous ^{54}Cr in basaltic achondrites (e.g.Trinquier *et al.* 2003) Cr analysis was extended to samples of common classes of stony and stony-iron meteorites. Cr isotopes are expected to vary only with the variable contributions of the different nucleosynthetic sources. Our ^{54}Cr results are compared to Δ^{17}O (=δ^{17}O - 0.52δ^{18}O) (Clayton *et al.* 1983, 1984, 1991, 1996, 1999) in a similar representation as that adopted by (Luck *et al*. 2003) for ^{65}Cu in chondrites.

^{54}Cr induces a classification of the meteorites classes comparable to the oxygen three-isotope plot data. Thus the combination of the two elements puts constraints on solar system formation. Two trends are distinguishable. The first is a correlation line between carbonaceous chondrites and is the most conclusive as this group consists of asteroids of the same class. The second is a more hypothetical trend through achondrites and ordinary chondrites of surprisingly similar slope. The pattern though it looks like (Luck *et al.*) δ^{65}Cu-Δ^{17}O correlations does not lead to comparable conclusions. We propose a mixing of at least two isotopic reservoirs in the nebula. One reservoir A is ^{54}Cr-rich and ^{16}O-rich and one reservoir B is ^{54}Cr-poor and ^{16}O-poor. The trends can be seen as evolutions from low to high metamorphic grade with increasing ^{16}O (model 1). This seems in contradiction with a model inspired by (Yurimoto *et al.*, 2004) where the mixing could evolve with time, and the relative proportion of reser-

voir B could decrease and its ^{17}O composition increase with the decreasing rate of gas accretion (model 2). Nevertheless model 1 relies on the hypothesis that the bodies with the lower metamorphic grade were the first to condensate. Further studies should clarify the distinction.

With regard to its neighboring-elements Cr constitutes a peculiar witness of nucleosynthetic components mixing in the early solar system.

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