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**Mn-Cr isotope study of ordinary chondrites: new information derived from chromites and bulk meteorites**

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Ordinary chondrites (OC) witness the early formation of planetary bodies in the asteroid belt. OC chondrule ages are 1.2 to 3 Myrs years younger than CAIs, which represent the oldest Solar System material [1,2]. The thermal metamorphism of the OC parent body started shortly after accretion and lasted for ~100 Myrs [3]; metal-silicate fractionation occurred 2 Myr after CAIs [4]. However, these ages are in conflict with mineralogical observations, and it is not possible to set up a model for the internal structure of OC parent bodies and their thermal history.

We separated 12 chromite fractions from OC and investigated their Mn-Cr systematics. An approach similar to the so-called ‘Sr initial method’ was applied to these chromites [5]. Beside chromites we also analyzed the corresponding bulk meteorites. The most salient results of our investigation are:

- The Cr initial ages of chromites from H-, L- and LL-chondrites lie between 4564.1 and 4559.7 Myr. These ages clearly correlate with the metamorphic degree of the host meteorite.
- The ‘two point isochrons’ between chromites and the corresponding bulk meteorites in the Mn/Cr evolution diagram indicate that the Mn-Cr system has been preserved mainly in type 4 chondrites. In contrast, it has been partially reequilibrated in other chondrites.
- The comparison between the Cr initial ages and the ages calculated from the two point isochrons shows that the age information derived from chromites is robust.
- We identify shock events as being responsible for the deviation of bulk OCs from the trend defined by carbonaceous chondrites in the Mn-Cr versus \(^{53}\)Cr evolution diagram.
- The U-Pb ages of phosphates are 1.2-58 Myrs younger than the Cr initial ages of chromites, in agreement with the lower closure temperature of phosphates. Mn-Cr and W-Hf ages are identical, reflecting similar closure temperatures of both systems.