THE BORON ISOTOPIC COMPOSITION OF ISHEYEVO (CH/CB) CALCIUM-, ALUMINIUM-RICH INCLUSIONS.

M. Gounelle[1], M. Chaussidon[2] & C. Rollion-Bard [1]Laboratoire de Minéralogie et de Cosmochimie du Muséum, CNRS & MNHN, UMR 7202, CP52, 57 rue Cuvier, 75 005 Paris, France. [2]Centre de Recherches Pétrographiques et Géochimiques, CRPG-CNRS, BP 20, 54501,Vandoeuvre-les-Nancy Cedex, France. (gounelle@mnhn.fr).

Introduction: Short-lived radionuclides (SRs) are radioactive elements with half-lives of ~ 1 Myr. The origin of SRs is highly debated, because it has important consequences for the physical environment of the early solar system. ^{10}Be (which decays to ^{10}B with an half-life $T_{1/2}$ = 1.5 Myr) plays a special role because it cannot be produced by stellar processes [1]. The abundance of ^{10}Be in the early solar system is poorly known. In Calcium-, Aluminium-rich Inclusions (CAIs) from the CV3 meteorites, the ratio ^{10}Be/^{9}Be was ~ 0.8 x 10^{-3} [1]. In the refractory hibonites (which lack ^{26}Al, $T_{1/2}$ = 0.7 Myr) from the CM2 chondrite Murchison, the ratio ^{10}Be/^{9}Be was ~ 0.5 x 10^{-3} [2]. These pioneering data seem to suggest that ^{10}Be abundance in the early solar system is decoupled from that of ^{26}Al [2, 3]. To account for the high abundance of ^{10}Be in the solar system, two kinds of models exist. Desch et al. [4] suggested that it was produced within the dense core progenitor of our solar system through the interaction of Galactic Cosmic Rays (GCRs) with ambient oxygen gas. Alternatively, ^{10}Be was produced within the solar system via the interaction of solar energetic particles with gas and/or dust in the protoplanetary disk [1, 5]. We undertook the task to measure the initial abundance of ^{10}Be in CAIs from CH chondrites, which are devoided of ^{26}Al [6].

Methods: We used the Nancy 1270 SIMS following methods described elsewhere [7].

Results: Compared to the last Lunar & Planetary Science Conference, we doubled the number of objects studied. 15 CAIs, dominated by spinel, hibonite and grossite, and belonging to the CH lithology of the Isheyevo chondrite are now well characterized. Because of the small size of CAIs, only three spots at most were made on each CAI. Internal isochrons were obtained for 4 CAIs with ^{10}Be/^{9}Be initial ratios varying between 0.9 x 10^{-3} and 3.2 x 10^{-3} and intercepts between 0.2465 and 0.2578. When plotted together, all data show a rough correlation between the isotopic ^{10}B/^{11}B ratio and the elemental ^{9}Be/^{11}B ratio. *If* interpreted as an isochron, it yields an initial ratio ^{10}Be/^{9}Be = (2.0 ± 0.15) x 10^{-3} with an intercept of $(^{10}B/^{11}B)_0$ = 0.2560 ± 0.00135 (MSWD = 2.5).

Discussion : Our data imply that the ^{10}Be abundance was extremely variable in CAIs. It would range from ~ 0.5 x 10^{-3} [2] to ~ 3 x 10^{-3} (this study). This contrasts very much from ^{26}Al in CAIs whose distribution is characterized by a bimodal abundance (^{26}Al/^{27}Al ~ 4.5 x 10^{-5} or ^{26}Al/^{27}Al ~ 0). Our data confirm the observation that ^{26}Al and ^{10}Be are decoupled. Beryllium-10 abundances seem to bear no chronological meaning. Implications for the models accounting for the presence of ^{10}Be in the early solar system will be discussed at the conference.

References: [1] K.D. McKeegan, et al., *Science* 289 (2000) 1334. [2] M.-C. Liu, et al., *Geochimica Cosmochimica Acta* 73 (2009) 5051. [3] K.K. Marhas, et al., *Science* 298 (2002) 2182. [4] S.J. Desch, et al., *ApJ* 602 (2004) 528. [5] M. Gounelle, et al., *ApJ* 548 (2001) 1051. [6] H.W. Weber, et al., *Geochimica Cosmochimica Acta* 59 (1995) 803. [7] M. Chaussidon, et al., *Geochimica Cosmochimica Acta* 70 (2006) 224.