

**PRESOLAR MATERIAL IN THE CH/CB CHONDRITE ISHEYEVO: A NANOSIMS ISOTOPIC STUDY.**

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**Introduction:** Isheyevo is a meteorite composed of distinct lithologies with mineralogical, chemical and isotopic similarities to CB and CH chondrites. Typically, matrix-like material is only present as hydrated lithic clasts [1]. The bulk sample is highly enriched in <sup>15</sup>N [2]. Different carriers have been proposed for the <sup>15</sup>N-enrichment. Either, shock-heating may have decomposed the original carrier and redistributed the nitrogen, or it is surviving protosolar cloud material [3,4]. Noble gas data imply the presence of carbonaceous presolar grains in CH chondrites [5], but to date, none have been directly observed. Preserved molecular cloud material within the hydrated lithic clasts may also host refractory presolar dust grains. Since silicates and oxides are among the most abundant types of presolar dust grains [6,7], we focused our search on O-anomalous matter. Investigating the occurrence and content of presolar matter in Isheyevo clasts can shed light on the formation history of Isheyevo and on the distribution of presolar grains and molecular cloud material in the part of the solar nebula from which its parent body formed.

**Samples and Experimental:** We performed ion imaging of 10×10 μm<sup>2</sup>-sized matrix areas in a section of the CH/CB<sub>b</sub> chondrite Isheyevo with a NanoSIMS 50 ion probe. <sup>16</sup>O<sup>-</sup>, <sup>17</sup>O<sup>-</sup>, <sup>18</sup>O<sup>-</sup>, <sup>28</sup>Si<sup>-</sup>, and <sup>27</sup>Al<sup>16</sup>O<sup>-</sup> were measured in multi-collection to identify presolar silicate and oxide grains. Subsequently, <sup>28</sup>Si<sup>-</sup>, <sup>29</sup>Si<sup>-</sup>, and <sup>30</sup>Si<sup>-</sup> were analyzed in one presolar silicate grain, as well as the C- and N-isotopic compositions of surrounding material.

**Results and Discussion:** 10,345 μm<sup>2</sup> of fine-grained material in matrix clasts of the CB<sub>b</sub>-like (metal-rich) lithology of Isheyevo have been analyzed for their O-isotopic composition. One presolar silicate grain has been identified in a hydrated lithic clast. Oxygen isotopic ratios are <sup>17</sup>O/<sup>16</sup>O = (3.99±0.28)×10<sup>-4</sup> and <sup>18</sup>O/<sup>16</sup>O = (2.91±0.07)×10<sup>-3</sup>. The 340 nm×290 nm-sized grain belongs to group 4, most likely originating in the ejecta of a core-collapse supernova [8], and is slightly depleted in the heavier Si-isotopes, with δ<sup>29</sup>Si = (-65±34) ‰ and δ<sup>30</sup>Si = (-88±41) ‰, respectively. Preliminary N-isotopic analyses revealed patches of <sup>15</sup>N-rich material (δ<sup>15</sup>N up to +1400 ‰, even higher in hotspots), as similarly observed in other carbonaceous chondrites [9]. The presence of presolar material in some hydrated clasts in the CB-lithology of Isheyevo supports the idea of surviving molecular cloud material as carrier of the <sup>15</sup>N-anomaly. This is fully compatible with the absence of shock metamorphism in similar clasts of the CH-lithology stated by [10].

**Acknowledgements:** We acknowledge support by DFG through SPP 1385.

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