INVESTIGATING THE PRESOLAR GRAIN INVENTORY OF CH CHONDRITES: A NANOSIMS STUDY OF ACFER 182.

J. Leitner[1], P. Hoppe[1], and J. Zipfel[2]. [1]Max Planck Institute for Chemistry, 55128 Mainz, Germany. E-mail: jan.leitner@mpic.de. [2]Forschungsinstitut und Naturmuseum Senckenberg, 60325 Frankfurt, Germany

Introduction: Primitive solar system materials contain varying amounts of presolar dust grains that formed in the winds of evolved stars or in the ejecta of stellar explosions. Presolar silicates and oxides are among the most abundant types of these grains [e.g., 1,2]. The CR chondrite clan, consisting of the CR, CH, and CB chondrite groups, contains some of the most primitive meteorites, sharing certain mineralogical and chemical similarities [3,4]. High abundances of presolar silicates and carbonaceous grains were recently reported in individual CR chondrites [5–7], and a first presolar silicate grain was observed in the CH/CB chondrite Isheyevo [8]. Noble gas data imply the presence of carbonaceous presolar grains also in CH chondrites [9], but no presolar O-anomalous grains have been detected so far. In this ongoing study, we conduct a search for O-anomalous presolar silicate and oxide grains in fine-grained material located in lithic clasts of the CH3 chondrite Acfer 182. Investigating the occurrence and content of presolar matter in CH chondrites can shed light on the formation history of their parent body.

Samples and Experimental: We performed ion imaging of 10×10 µm²-sized matrix areas in a thin section of the CH3 chondrite Acfer 182 (paired with Acfer 207 and Acfer 214 [10]) with the NanoSIMS 50 ion probe in Mainz. $^{16}O^-$, $^{17}O^-$, $^{18}O^-$, $^{28}Si^-$, and $^{27}Al^{16}O^-$ were measured in multi-collection to identify presolar silicate and oxide grains.

Results and Discussion: 4,700 µm² of fine-grained material in matrix clasts have been analyzed for their O-isotopic composition. No presolar grains have been identified so far; based on the average presolar silicate grain size of ~300 nm, we estimate an upper limit of ~15 ppm for Acfer 182. This is comparable to the presolar silicate abundance of ~10 ppm we found for Isheyevo. The formation scenario for the CH chondrites is still under debate. According to a popular model, CH chondrites may represent a mixture of material produced by a giant impact between planetary bodies and nebular components that formed by thermal processing of dust in the protoplanetary disk [11, and references therein]. Detection of presolar grains in these meteorites would proof that at least one of the components contained interstellar matter that survived the impact. This would give support to the idea that surviving molecular cloud material might be one of the carriers of the large ^{15}N enrichments of CH chondrites.

Acknowledgements: We acknowledge support by DFG through SPP 1385.

References: [1] Nguyen A. et al. 2007. *Astrophys. J.* 656:1223–1240. [2] Hoppe P. 2008. *Space Sci. Rev.* 138:43–57. [3] Weisberg M. K. et al. 1995. *Proc. NIPR Symp. Antarct. Meteorites* 8:11–32 [4] Krot A. N. et al. 2002. *Met. Planet. Sci.* 37:1451–1490. [5] Floss C. and Stadermann F. J. 2009. *GCA* 73:2415–2440. [6] Leitner J. et al. 2011. *Astrophys. J.*, submitted. [7] Nguyen A. N. et al. 2010. *Astrophys. J.* 719, 166–189. [8] Leitner et al. 2010. *Met. Planet. Sci.* 45:A166. [9] Huss G. R. et al. 2003. *GCA* 67:4823–4848. [10] Bischoff A. et al. 1993. *GCA* 57:2631–2648. [11] Bonal L. et al. 2010 *GCA* 74:6590–6609.