**RECOIL LOSS OF COSMOGENICALLY PRODUCED HELIUM AND NEON IN PRESOLAR GRAINS.** R. Trappitsch and I. Leya. Space Research & Planetary Sciences, University of Bern, CH3012 Bern, Switzerland. trappitsch@space.unibe.ch

**Introduction:** Presolar dust grains found in meteorites are widely considered to originate from areas beyond the solar system, an assumption mainly based on their unique isotope composition [1]. Of special interest among these grains are those consisting of silicone carbide (SiC), which represent the second most abundant type of presolar grains found in meteorites. SiC grains are usually larger than the other presolar grain types. Furthermore, SiC grains have a similar hardness as diamond and were therefore able to survive the solar system forming processes almost unaltered [1]. Since the presolar grains were irradiated by galactic cosmic-rays on their way through the interstellar medium (ISM), it is possible to determine their cosmic-ray exposure ages using stable cosmogenic nuclides. However, for a proper interpretation of the cosmogenic nuclide record, a detailed knowledge of the production rates is needed. In contrast to bulk meteorites, where physical models are available [2,3], no reliable model exists for presolar grains and/or micrometeorites.

**Model:** Modeling the cosmogenic production rates in presolar grains and micrometeorites requires – besides of the nuclear production pathways – to consider also recoil losses. Doing so, we calculated the recoil spectra for the relevant target-nuclide combinations for energies from 1 MeV to 240 MeV using the code TALYS-1.0 [4]. Recoil spectra for higher energies will be modeled using state-of-the-art Monte Carlo methods. By combining the thus obtained data with stopping calculations we are able to quantify total recoil losses based on very few input parameters (chemical composition and size of the grain, shape of the GCR spectrum).

**Irradiation experiment:** To validate our model we will perform various irradiation experiments with Si foils and artificial SiC grains. The experiments will be performed with protons having primary energies of 72 MeV and 260 MeV at the Paul Scherrer Institute in Villigen/Switzerland. In this irradiation experiments recoil losses of radionuclides ($^{7}$Be, $^{22}$Na) and noble gases ($^{3,4}$He, $^{21,22}$Ne) can directly be measured and compared with our model predictions.

**Discussion:** Setting up a reliable model for production rates of cosmogenic nuclides in presolar grains and micrometeorites will significantly improve our understanding of the origin and history of the presolar grains as well as helping to constrain the conditions in the ISM before the formation of the solar system.

**References:** [1] Hoppe P. and Zinner E. 2000. *Journal of Geophysical Research.* 105:10371–10385. [2] Ammon K., Masarik J. and Leya I., 2009. *Meteoritics & Planetary Science*, in press. [3] Leya I. and Masarik J. 2009. *Meteoritics & Planetary Science*, in press. [4] Koning A.J., Hilaire S. and Duijvestijn M.C. 2005. *Proceedings of the International Conference on Nuclear Data for Science and Technology – ND2004.* 769:1154.