SOLAR NOBLE GASES IN VIGARANO BULK MINERALS - FIRST RESULTS OF THE NEW "BENGEL" IN-VACUO ETCHING FACILITY.

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Introduction: *Regolith breccias* are breccias that contain solar-gas-bearing grains [1,2]. It is generally accepted that the exposure to the solar wind took place rather recently on the surface of a parent body. However, it appears possible that grains were exposed early (or obtained their solar gas load by other mechanisms) *prior* to accretion. Some of the solar gases in chondrites may indeed be "primordial" [3,4]. In the CI chondrite Orgueil, the presence of solar gases is restricted to magnetite, whereas the silicates appear solar-gas-free [3]. This is difficult to reconcile in a planetary environment. The observation that solar-like gases in the unbrecciated E chondrite St. Mark's were released only upon severe etching provides further evidence for the presence of primordial solar gas [5]. In contrast, solar gases in lunar regolith grains reside in the uppermost layers and are released by stepwise etching already during the first minutes of etching [6]. The trapped noble gas content in HF/HCl-soluble minerals of meteorites is generally small. However, abundant solar-like gases have been found e.g. in chondrules and a dark inclusion [7,8]. These primitive objects were located in solar-gas-poorer matrices. This supports the idea of a non-regolithic origin of the solar noble gases. Further, more detailed analyses of the noble gases in bulk meteorite material are needed to clarify the issue of their origin.

Experiment: We have chosen bulk material of Vigarano (CV3), because its solubles contain relatively abundant solar gases, which led to the conclusion that Vigarano is a regolith breccia [1,9,10]. The continuing analysis is the first experiment with our new noble gas extraction facility "BENGEL" (*B*ernese in-vacuo *E*xtraction of *N*oble *G*ases in a Gold-Platinum *E*tch *L*ine). Currently the crushed sample is etched with HF vapor.

Results: The first four etch steps have released ~10% of the expected amounts of noble gases. Neon in all steps is similar to that of the bulk, which indicates a homogeneous mixing of a trapped component, which is possibly solar, and cosmogenic Ne. The progressive etching releases trapped meteoritic Ar ($^{40}Ar/^{36}Ar < 60$, $^{36}Ar/^{38}Ar > 5$). Kr and Xe are mainly atmospheric, except for $^{129}Xe/^{132}Xe$, which indicates some addition of radiogenic ^{129}Xe. The complete data set will be presented at the meeting. The simultaneous early release of the volume-correlated cosmogenic Ne and the surface-correlated solar gas indicates that the trapping of the solar gases may have occurred prior to the final assemblage of the mineral grains or that the solar gases have been transferred into the grains, e.g. due to impact.

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