PETROFABRIC OF ZAG AND PUŁTUSK METEORITES: IMPLICATIONS FOR IMPACT CONDITIONS ON THE H CHONDRITE PARENT BODY.

A. Krzesińska[1], J. Gattacceca[2], J.M. Friedrich[3,4] and P. Rochette[2]. [1]Institute of Geological Sciences PAS, INGPAN, Wrocław, Poland. ag.krzesinska@gmail.com. [2]CEREGE UM34, CNRS, Aix-Marseille University, Aix-en-Provence, France. [3]Department of Chemistry, Fordham University, New York, USA. [4]Department of Earth and Planetary Science, American Museum of Natural History, New York, USA.

Introduction: Chondritic rocks usually posses well defined petrofabric [e.g. 1,2]. In general, they show fabric dominated by foliation, and thus it is basically accepted that the main fabric-forming process was uniaxial compression during impact event [2,3,4]. However, some chondrites, and especially H chondrites, reveal presence of distinct or even dominant lineation fabric [3,4,5], formation of which needs additional explanation.

The fabric of two H chondrites, Zag and Pułtusk, was investigated by: (1) anisotropy of magnetic susceptibility (AMS) measurements (technique of [2]); (2) tomographic reconstruction of metal grains; and (3) microscopic petrographic observations.

Results: *Petrofabric.* Both Pułtusk and Zag are brecciated chondrites. Host chondritic rocks are sheared and micro-faulted and displacements of chondrules, silicate or metal grains up to 500 μm are observed. The widest shear zones coincide with the darkened areas, which bear record of complex mineral reorganization and cataclasis. In such cataclastic zones, clasts and minerals are elongated/flattened, display traces of rotation and arrangement in accordance with shear direction in the host.

Metal grain fabric. Tomographic examination indicate that metal grains in host and cataclastic parts of the chondrites are significantly anisometric in shape and prolate grains dominate. The grains reveal preferential orientation and their longest axes are scattered along a great circle, forming a foliation plane. Preferred direction is observed, defining lineation.

Magnetic fabric. In both chondrites, zones of cataclasis reveal higher magnetic anisotropy than the host rock. AMS ellipsoids yield different shapes, with oblate and triaxial dominating in Pułtusk and prolate–triaxial in Zag. Significant magnetic lineation is present in Pułtusk and it dominates in Zag.

Despite the distinctly brecciated texture, the chondrites reveal spatially coherent orientation of magnetic fabric through cataclastic zones and the host rock. Magnetic foliation is oriented parallel to the cataclastic zones' boundaries, and shearing direction in the host and it is coherent with the metal grain fabric.

Conclusion: Based on spatial coherence of shear zones and metal grain fabric, we suggest that the brittle brecciation of silicates and formation of the cataclastic zones observed in Pułtusk and Zag were simultaneous with the ductile deformation of metallic grains. As the fabric is dominated by prolate metal grains defining not only a foliation plane but also a lineation direction, we propose it is the result of noncoaxial deformation during impact event on the parent body, the only process which can cause elongation of grains and their oblate arrangement [6].

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