CHONDRULE MAGNETIC CONGLOMERATE TEST OF AVANHANDAVA H4 CHONDRITE. T. Kohout[1, 2, 3] and Lauri J. Pesonen[2]. [1]Division of Geophysics, Faculty of Science, University of Helsinki, Finland. E-mail: tomas.kohout@helsinki.fi. [2]Department of Applied Geophysics, Faculty of Science, Charles University in Prague, Prague, Czech Republic. [3]Institute of Geology, Academy of Sciences of the Czech Republic, Prague, Czech Republic.

Introduction: The Avanhandava (H4) fall occurred in 1952 in Brazil. A total of 9.33 kg had been preserved after the meteorite brake up during the impact [1]. The bulk petrophysical parameters (density 3.39 g/cm^3 and magnetic susceptibility 0.73 SI) reflect H4 range [5]. The meteorite contains large (0.1 – 2.0 mm) chondrules that have clearly delineated boundaries with matrix. This characteristic allows us to pick up oriented individual chondrules and study their magnetic properties.

Magnetic properties of chondrules and matrix: The chondrules carry a weak NRM (Natural Remanent Magnetization) in order of 10^{-2}. – 10^{-1} mAm^2/kg, low coercivities (< 10 mT) and a low J_{sr} to J_s (saturation remanent magnetization to saturation magnetization) ratio (~10^{-2}). The matrix carries two orders of magnitude higher NRM values (10^0 – 10^1 mAm^2/kg), slightly higher coercivities (~30 mT) and a higher J_{sr} to J_s ratio (~10^{-1}). From the temperature dependence of magnetic susceptibility data Fe-Ni alloy was identified in chondrules and matrix. The matrix shows remarkable traces of terrestrial weathering (ochre tint) and the contribution of magnetite (probable weathering product) was observed in susceptibility data. The NRM of both the chondrules and the matrix is mostly stable up to 10 mT alternating field.

Chondrule magnetic conglomerate test: The chondrule magnetic conglomerate study was done by removing oriented chondrules from the meteorite matrix and comparing the direction of their NRM with respect to each other and to the matrix. The direction of the NRM of the chondrules seems to be randomly oriented within the meteorite. In contrast the neighboring matrix fragments show consistent directions of the NRM vectors.

Paleofield estimate: The paleofield method based on the REM ratio (NRM/J_{sr}) [2] reveals approximate paleofields between 5 μT and 20 μT (REM ~ 0.002) for chondrules. The REM value (~ 0.02) of the matrix is in the range observed on terrestrial rocks.

Conclusions: The chondrules of the Avanhandava meteorite show a low and randomly oriented NRM and the paleofield determined is almost one order of magnitude lower that geomagnetic field. That suggests that chondrules are not magnetically contaminated by geomagnetic or artificial fields and they acquired their NRM prior their aggregation to Avanhandava parent body. The matrix shows remarkable traces of terrestrial weathering and is strongly magnetized in one direction what together with the REM value characteristic for terrestrial rocks can be a result of remagnetization during terrestrial weathering. The terrestrial weathering of ordinary chondrites is observed even on falls stored in museums and can significantly influence meteorite magnetic records [3, 4].

References: [1] Paar W. et al. 1976. *Revista Brasileira de Geociencias* 6: 201–210. [2] Kletetschka G. et al. 2003. *Meteoritics & Planetary Science* 38: 399-405. [3] Kohout T. et al. 2004. *Physics and Chemistry of the Earth* 29: 885-897. [4] Lee M. R. and Bland P. A. 2004. *Geochimica et Cosmochimica Acta* 68: 893-916. [5] Terho M. et al. 1993. *Studia Geopgysica et Geodaetica* 37: 65-82.