SIGNS OF TWO-STAGE MAGMATISM BASED ON PETROLOGICAL INTERPRETATION FOCUSING ON CRYSTAL FEATURES IN NWA 7397 MARTIAN METEORITE. A. Zemeny[1], A. Kereszturi[2], Kereszty Zs.[3] [1]Eotvos Lorand University of Sciences, H1117, Budapest, Pazmany setany 1/c., [2]A Research Centre for Astronomy and Earth Sciences, Konkoly Thege Miklos Astronomical Institute, Hungary. [3]International Meteorite Collectors Association (IMCA#6251) (E-mail: alizzemeny@gmail.com)

Introduction: Shergottites are classified into three subgroups: 1. basaltic, 2. olivine-phyric and 3. lherzolitic [1]. Lherzolitic shergottites have similar petrological and geochemical characteristics as the two other subgroups and they originated from the same igneous unit on Mars [2, 3]. Lherzolitic ones represent cumulate rocks, while basaltic and olivine-phyric shergottites indicate extrusive origin. According to Usui et a., (2010), lherzolitic shergottite first was described with LREE enrichment (sample RBT 04261/2) and then one another sample was classified (GRV 020090; [4]) in this group. NWA 7397 represents an example of lherzolitic composition, which was found in Morocco in 2012. It is characterized by an enriched whole-rock REE profile and enriched-lherzolite example [5].

Methods: One thin section was made from NWA 7397 (11x16 mm) by Kereszty Zs.. Petrological features were investigated using NICON Eclipse E600 POL microscope to identify features for further study using sophisticated facilities (example images: Fig. 1, 2).

General petrography: The sample's texture could be divided into two lithology-subgroups (% values based on surface quantites): 1. poikilitic (40%) and 2. non-poikilitic (60%). Poikilitic areas have large pyroxene oikocrysts (0.4-0.5 cm), which enclose smaller olivine (1 mm) and opaque (0.1-0.2 mm) chadacrysts. The boundaries of the chadacrysts and oikocrysts are sharp and non-distracted.

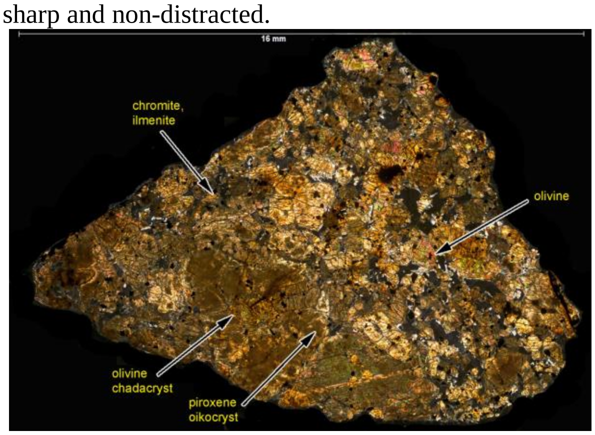

Figure 1. Thin section image (cross Nikol) of sample. Note the grain size distribution according to the two types of region which shows the differences between the size of crystals

Grain size distribution in non-poikilitic area is clearly noticeable. It is described with olivines (<1.4 mm) and pyroxenes (1.2–1.6 mm) as major phases, and possibly sites chromite, ilmenite (0.1-0.3 mm) and maskelynite as minor phases. Both olivines and pyroxenes often includes chromite or ilmenite inclusions. Moreover, non-poikilitic area includes more opaque crystals than the pyroxene oikocrysts, but their size doesn't change marginally. The meteorite sample indicates strong shock metamorphism based on melt veins in both poikilitic and non-poikilitic texture's crystals and mosaic fissures in both region's minerals that were formed during shock induction. Furthermore, maskelynite indicates the conversion from plagioclase which is the influence of the shock impact as well.

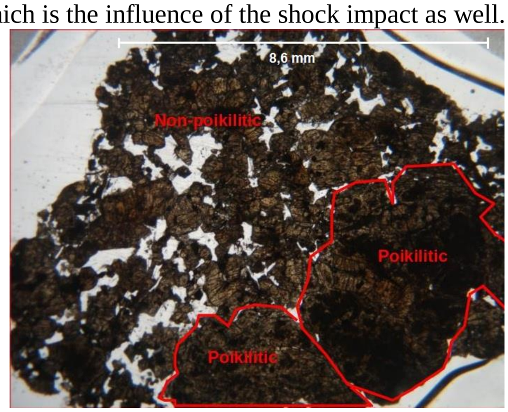

Figure 2.: Figure 2. Optical light photomicrograph picture of the sample. Red lines indicate poikilitic and non-poikilitic texture's borders.

Interpretation of magmatic texture: The aim of this work is to identify, which type of magmatic events could be identified using only one simple Martian thin section, and how much could these findings connected to our general magmatic/volcanic information of Mars. The poikilitic region were first formed by the crystallization of pyroxene oikocrysts. It was followed by the intercumulus melt crystallization that created the non-poikilitic region that were formed at shallower depths and lower temperatures [5] and created olivine, pyroxene and possibly maskelynite phases. Further analysis is going on to study the compositional differences between the units.

References: [1] Goodrich et al. (2013) *Meteor & Planet. Sci*, 48, 2371-2405; [2] Nyquist et al. (2001). *Space Sci. Rev.* 96: 105-164; [3] Bridges and Warren (2006) *Journal of the Geological Society* 163: 229-251; [4] Usui, T. et al. (2010) *GCA* 74: 7283; [5] Howarth et al. (2014) *45th LPSC* #1310.