SSP (SYNTHETIC SHERGOTTITE POWDER), A NEW MARTIAN ANALOGUE FOR DESTRUCTIVE ANALYSIS AND EXPERIMENTS. V. Fortier[1,2], V. Debaille[2], V. Dehant[1,3], and B. Bultel[4]. [1]ELI, UCLouvain, Louvain-la-Neuve, Belgium (valentin.fortier@uclouvain.be); [2]Laboratoire G-Time, ULB, Brussels; [3]Royal Observatory of Belgium, Brussels, Belgium; [4]CEED, UiO, Oslo, Norway.

Introduction: Martian rocky material available on Earth is only composed of meteorites and is quite limited in terms of mass and numbers. So far, less than 200 kg of material distributed unevenly among around 280 martian meteorites is available, and this limited amount directly impairs the possibility to perform destructive analyses and experiments, such as alteration and hydrothermal experiments. One of the main aspects of the current Mars2020 mission and the following ones is to bring back rock samples from Mars in the next 10 years [1]. However, while we will have a geological context for the samples, the total mass that will be collected will also be limited. It is thus crucial to seek for analogs of martian meteorites [2], not suffering this limitation while bearing specific properties of the martian meteorites. It is important to note that an analog must not need to be perfect but fit for the purpose of the considered experiments.

Methodology: To overcome this problem, we suggest an analogue to a typical non-altered shergottite from a chemical and mineralogical perspective. To do so, we selected 6 of the 7 main mineral phases present in shergottites (Fig. 1) and for each phase we picked multiple pure terrestrial mineral powders selected for their chemistry close to their *shergottitic* counterparts (Fig. 2). Those mineral phases being terrestrials and coming from only 3 different relatively easy access locations, the assemblage is virtually unlimited.

A version of this SSP (Synthetic Shergottite Powder) analogue has been already used in some hydrothermal experiments for serpentinization and methanation in martian conditions [3]. It has also been proposed for the ExoMars2022 mission lead by ESA as analogue of the rover landing site Oxia Planum as representative of the base and/or capping unit(s) [4].

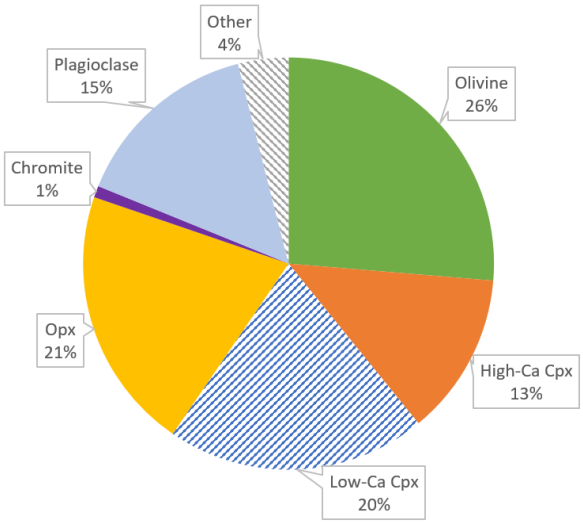

Fig. 1. Antarctic shergottites average mineral proportions (%vol) [compiled from literature data].

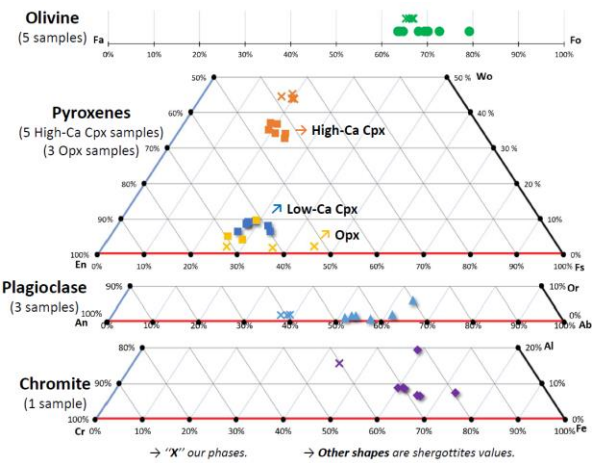

Fig. 2. Chemical poles of the selected pure terrestrial minerals ("X" symbols) and their *shergottitic* counterparts (other symbols) [compiled from litterature data].

References: [1] Muirhead K. B. et al. (2020) *Acta Astronautica, 176, 131-138*. [2] Foucher F. et al. (2021) *Planetary and Space Science, 197, 105162*. [3] Fortier V. et al. (2022) *this conference*. [4] Quantin-Nataf C. et al. (2021) *Astrobiology, 21, 345-366*.