THE PUERTO LÁPICE EUCRITE. FREE SAMPLE DELIVERY FROM VESTA: TRAJECTORY, ORBITAL SOLUTIONS, AND SHOCK HISTORY FROM CATHODOLUMINESCENCE.

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Introduction: A daylight fireball was witnessed all over Spain in the afternoon of May 10, 2007. Several pictures of the fireball's train taken from different locations in Spain, and eyewitnesses reports allowed the determination of its trajectory and range of orbital solutions. The progenitor meteoroid was in an Apollo-type orbit, with low inclination and perihelion distance just below 1 Astronomical Unit [1]. The meteorite was recovered a few weeks after its fall, and presented to the community in the Meteoroids 2007 conference of Barcelona in June 2007 [2]. A detailed characterization of Puerto Lápice meteorite revealed its eucritic and brecciated nature [3]. Oxygen isotopes also confirmed that it belongs to the HED suite, the main group of basaltic eucrites [3]. The meteorite probably suffered a complex shock history as reveals the presence of abundant shock veins that evidence at least three different shock events.

Procedure: To learn more about the shock history of Puerto Lápice eucrite we have used a catholuminescence system based in a scanning electron microscope (SEM), Zeiss SUPRA 55VP working at 25 kV and a sample current of <1 nA. The system has a mirror that allows the collection of CL photons either to obtain a CL image or to derive the spectrum of the emitted light with a probe. This system has been previously used to propose a shock index for shergottites [4]. We will mainly focus in the small grains of silica identified in this eucrite [3] to try to identify other silica phases formed during shock compression.

Conclusions: The range of orbital solutions found for Puerto Lápice eucrite [1] indicate that the progenitor meteoroid was in an Apollo-type orbit probably released from Vesta family by the 3:1 or ν_6 resonances. This is a different source than the recently recovered Bunburra Rockhole eucrite in Australia [5]. Fine grained recrystallized clasts containing silica were previously identified in Puerto Lápice eucrite [3]. Our present CL study of the silica phases present in those clasts permits to constrain the maximum shock pressure suffered by this meteorite. This information provides additional clues on the collisional history suffered from its progenitor. All together will provide a more complete view of the dynamic pathway, and the presumable complex history for delivering this rock from Vesta to our planet.

References: [1] Trigo-Rodríguez et al. 2009. *Meteorit. Planet. Sci.* 44: 175-186. [2] Trigo-Rodríguez et al. 2008. *Earth Moon & Planets* 102: 1-4 [3] Llorca J. et al. 2009. *Meteorit. Planet. Sci.* 44: 159-174. [4] Chennaoui Aoudjehane H. et al. 2005. *Meteorit. Planet. Sci.* 40: 967-979. [5] Bland P. A. et al. 2009. Abstract #1664. 40th Lunar & Planetary Sci. Conf.