

**NWA 7387: COMPOSITIONAL AND TEXTURAL FEATURES OF A NEW MARTIAN METEORITE.** V. Moggi-Cecchi<sup>1</sup>, S.Caporali<sup>1</sup>, G.Pratesi<sup>2</sup>, I.A.Franchi<sup>3</sup>, R.C.Greenwood<sup>3</sup>, <sup>1</sup>Museo di Scienze Planetarie, Via Galcianese 20/h, I-59100 Prato, Italy, e-mail: [v.moggi@pratoricerche.it](mailto:v.moggi@pratoricerche.it), <sup>2</sup>Dipartimento di Scienze della Terra dell'Università degli Studi di Firenze, Via G.La Pira 4, I-50123 Firenze, Italy, e-mail: [g.pratesi@unifi.it](mailto:g.pratesi@unifi.it), <sup>3</sup>Planetary and Space Sciences Research Institute, Open University, Walton Hall, Milton Keynes, GB-MK7 6AA United Kingdom.

**Introduction:** A single stone weighing 392 g was purchased in 2012 by Giorgio Tomelleri in Erfoud, Morocco. The outer surface of the main mass is covered by a black fusion crust. A cut surface displays dark green crystals set in a pale green matrix. The type specimen, weighing 20.13 g, one polished thin section [1] and a block are on deposit at the Museum of Planetary Sciences (MSP) of Prato, Italy (inventory number MSP 5203). Giorgio Tomelleri owns the main mass.

**Description:** SEM images have been performed at the Earth Sciences Department of the University of Florence by means of a Zeiss 515 SEM. EMPA-WDS analyses have been performed at the Padova laboratories of the IGG – CNR (National Council of Research) with a Cameca Camebax Microbeam microprobe. Oxygen isotope measurements have been performed at the Planetary and Space Sciences Research Institute Laboratories of the Open University. The thin section of NWA 7387 shows a cumulitic fine-grained porphyritic texture consisting of rounded phenocrysts of olivine up to 1200  $\mu\text{m}$  in size set in a fine-grained basaltic ground-mass of pyroxene crystals from 90 to 210  $\mu\text{m}$  wide and 120 to 780  $\mu\text{m}$  long surrounded by a glassy, maskelynite matrix. The rare olivine crystals are zoned (Figure 1). Opaque phases are mainly consisting of ilmenite, up to 110  $\mu\text{m}$ , chromite, titanian chromite and merrillite, with rare pyrrhotite grains up to 40  $\mu\text{m}$  in size. Shock features like undulose extinction and twinning in pyroxene as well as strong mosaicism and planar deformation in olivine are distinguishable. EMPA analyses revealed inhomogeneity in olivine (core:  $\text{Fo}_{59,6}$ ; rim:  $\text{Fo}_{66,8}$  mol. %). Pyroxene is primarily pigeonite (Figure 1), with a mean composition of  $\text{Fs}_{18,8}\text{En}_{49,0}\text{Wo}_{33,1}$  ( $\text{FeO}/\text{MnO} = 36.3$ ). Orthopyroxene is mainly ferrosilite-rich ( $\text{Fs}_{29,5}\text{En}_{60,9}\text{Wo}_{9,6}$ ;  $\text{FeO}/\text{MnO} = 30.9$ ). The matrix glass is plagioclase-like ( $\text{An}_{46,4}\text{Or}_{2,96}$ ). Oxygen isotope data (I.A.Franchi, R.C.Greenwood, *OU*) plot in the SNC field:  $\delta^{17}\text{O} = 2.68$  ‰,  $\delta^{18}\text{O} = 4.54$  ‰,  $\Delta^{17}\text{O} = 0.322$  ‰ (mean on 2 analyses).

**Conclusions:** Textural and compositional data as well as similarities with other SNC meteorites from Sahara (Dag 476, 489 and 670 [2,3,4]; Northwest Africa 4222) point to a classification as martian meteorite. Oxygen isotope data are consistent with this classification.

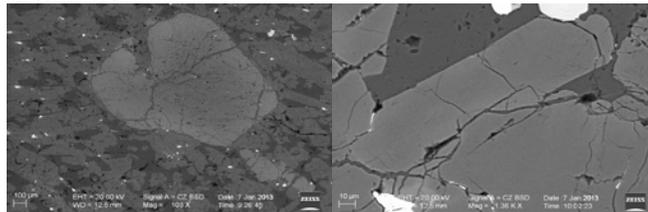


Figure 4: SEM-BSE image of the martian meteorite NWA 7387 (sample MSP 5203). The large rounded grain, dark-to-pale grey (core-rim), is olivine (left); elongated crystals are pyroxene (right); dark grey areas are glass;

**References:** [1] Garvie, A.J. et al. (2013) *MAPS*, 48, in press; [2] Zipfel J. et al. (2000) *MAPS*, 35, 1, 95–106. [3] Folco L. et al. (2000) *MAPS*, 35, 4, 827–839; [4] Folco L. and Franchi I.A. (2000) *MAPS*, 35, 5, A54;