

### NWA 903 AND 1709: TWO NEW UNEQUILIBRATED ORDINARY CHONDRITES FROM NORTHWEST AFRICA

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, Provincia di Prato, e-mail: [v.moggi@pratoricerche.it](mailto:v.moggi@pratoricerche.it), Via Galcianese, 20/h, I-59100 Prato, Italy, <sup>2</sup>Dipartimento di Scienze della Terra, Università di Firenze, Via La Pira, 4, I-50121, Florence, Italy, <sup>3</sup>PSSRI, The Open University, Milton Keynes, MK7 6AA United Kingdom.

**Introduction:** NWA 903 and 1709 are two meteorites, weighing 500g and 9g, respectively, both bought at Erfoud market by an anonymous buyer. The first one is formed by several stones, with no traces of fusion crust, while NWA 1709 is a dark brown single piece with fusion crust traces. Both the type specimens (weighing 1.7 g and 28.9 g) and the polished thin sections are on deposit at Museo di Scienze Planetarie, Prato, Italy (inv. N° 2372 and 2262). An anonymous collector holds both the main masses [1, 2].

**Description:** NWA 903 - The thin section of the meteorite consists of chondrules 300-600  $\mu\text{m}$  in size, of different types (PO, POP, BO, RP) and their fragments embedded in a fine-grained silicate matrix. Some olivine grains in BO and PO chondrules are markedly zoned and contain a glassy mesostasis. Opaque phases are mainly represented by kamacite and taenite, with minor troilite; EMPA analyses performed on olivine (inside and outside chondrules) and low-Ca pyroxene provided the following results: olivine is  $\text{Fo}_{98,38-64,83}\text{Fa}_{1,62-35,17}$  (mean values  $\text{Fo}_{85,15}\text{Fa}_{14,85}$ , P.M.D.<sub>Fo</sub> = 12.5; P.M.D.<sub>Fa</sub> = 71.4); Low-Ca pyroxenes range from  $\text{Fs}_{4,08}\text{En}_{95,42}\text{Wo}_{0,50}$  to  $\text{Fs}_{17,90}\text{En}_{82,16}\text{Wo}_{0,48}$ . A diopsidic pyroxene has been found, too. Weathering grade is W3; shock stage is S1.

NWA 1709 - The overall texture consists of chondrules 250-550  $\mu\text{m}$  in size, of different types (PO, POP, BO, RP) and their fragments embedded in a fine-grained matrix; matrix silicates are mainly olivine and orthopyroxene, with minor clinopyroxene; markedly zoned olivine grains in BO and PO chondrules, containing a glassy mesostasis, can be occasionally found; opaque phases are kamacite and troilite. EMPA analyses performed on olivine and low-Ca pyroxene provided the following results: olivine  $\text{Fo}_{98,81-78,74}\text{Fa}_{1,19-21,16}$ , mean  $\text{Fo}_{84,59}$  [ $\text{Fa}_{15,41}$ ] (P.M.D.<sub>Fo</sub> = 8.6; P.M.D.<sub>Fa</sub> = 47.5); low-Ca pyroxene  $\text{Fs}_{4,82-16,86}\text{En}_{94,97-82,38}\text{Wo}_{0,21-0,76}$ , mean  $\text{Fa}_{11,68}\text{En}_{87,89}\text{Wo}_{0,43}$  (P.M.D.<sub>En</sub> = 5.0; P.M.D.<sub>Fs</sub> = 38.7). A diopsidic pyroxene has been found, too ( $\text{Fa}_{11,74}\text{En}_{51,01}\text{Wo}_{37,24}$ ). Weathering grade is W3; shock stage is S2. Oxygen isotope analyses performed on unweathered bulk sample gave the following results: (R.Greenwood, I.Franchi, *OU*),  $\delta^{18}\text{O} = 2,840 \text{‰}$ ;  $\delta^{17}\text{O} = 4,448 \text{‰}$ ;  $\Delta^{17}\text{O} = 0,527 \text{‰}$ .

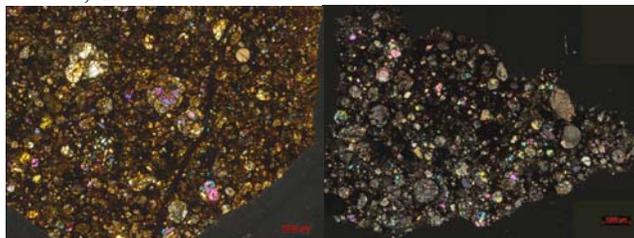


Figure 1: photomosaic of polarizing optical microscope images of NWA 903 (left) and NWA 1709 (right); transmitted light, crossed polars; marker = 1 mm.

**Conclusions:** Compositional data suggest for both these meteorites a classification as H chondrites. The low amount of integration between chondrules and matrix, together with the spreading of Fa values of olivine suggest a very low (3.5) and low (3.8) petrologic type for NWA 903 and NWA 1709, respectively.

**References:** [1] Russel S. et al. (2005) *M&PS*, **40**, **9**, A201–A263 (2005); [2] Weisberg M.K. (2008), *M&PS*, **43**, **9**, 1551–1588.