NWA 1559: ANOTHER ANOMALOUS CK3 CHONDRITE? F. Brandstätter[1], M. Bukovanská[2] and G. Kurat[1], [1]Naturhistorisches Museum, Postfach 417, A-1014 Vienna, Austria, [2]National Museum, CZ-11821 Praha, Czech Republic.

Introduction: Most CK chondrites studied so far are metamorphosed (petrologic types 4-6). Among the unequilibrated CK chondrites several meteorites were described as CK3-anomalous with a suggested relationship to CV3 chondrites, e.g., [1-3]. Here we report on the petrography and mineralogy of the recently described CK3 chondrite NWA 1559 [4] which was purchased as a single stone with a mass of 284 g in the Zagora region, Morocco. Our sample, a cut piece weighing 17 g, is a greenish-gray compact stone covered in part by black fusion crust. Various well pronounced chondrules and inclusions can be seen on the cut surface.

Results: Microscopically, the meteorite consists of matrix (mean grain size about 10-20 μm) and clearly distinguishable chondrules and inclusions. Matrix constituents are predominantly olivine, minor pyroxene, plagioclase, magnetite and rare sulfides. No metal could be detected within the section investigated. Chondrules (mainly BO, PO, and BPO) have diameters ranging from <0.5 to 2 mm. The different types of inclusions include concentrically layered olivine aggregates with plagioclase and minor fassaite, various olivine-plagioclase intergrowths of irregular shape and coarse-grained olivine objects consisting of large (up to 0.5 mm) single olivine crystals with either glassy or fine-grained mesostasis, and fluffy plagioclase-diopside intergrowths. One large coarse-grained CAI (>4x7 mm^2) was studied in detail and consists of fassaite, plagioclase, Mg-Al spinel, minor olivine and grossular and rare magnetite and pentlandite.

Olivines in chondrules and coarse-grained objects are strongly zoned having Fe-rich rims (~Fa34) and Fe-poor cores (~Fa1.5). Their contents of MnO and NiO are positively correlated with Fa contents in the range 0.3-<0.02 wt% MnO and 0.4-<0.02 wt% NiO. Most matrix olivines have a rather restricted composition of Fa34-37 with ~0.3 wt% MnO and 0.4-0.5 wt% NiO. The Ca-rich pyroxenes are mainly diopsidic (5.7-11 mol% Fs) and Al-poor (~0.1-0.3 wt% Al2O3). The composition of magnetites is characterized by high contents of Cr_2O_3 (2.5-3.8 wt%), MgO (0.7-1.0 wt%) and NiO (~0.5 wt%) and relatively low contents of V_2O_3 (~0.3 wt%).

Discussion: The presence of Cr-rich magnetite as the by far most abundant opaque phase, the absence of metal and the NiO content of olivine indicate that NWA 1559 is a CK chondrite. The range of Fa content and its positive correlation with NiO and MnO contents in chondrule olivines is similar to what has been described for chondrule olivine from the CK3-an chondrite Dar al Gani 431 [3]. Furthermore, the restricted range of Fa content and the NiO concentration of matrix olivine is comparable those of matrix olivine in the CK3 meteorite Watson 002 [1]. However, previous studies of CK3 meteorites [1-3] revealed that on the basis of mineralogy, bulk chemistry and oxygen isotopic composition there is a relationship between CK3 and CV3 chondrites. Conversely, the recently studied CV3 chondrite Sayh al Uhaymir 085 [5] shares some mineralogical features with CK meteorites. Although petrography and mineral chemistry indicate that NWA 1559 is a member of the CK chondrite group, a possible relationship of this meteorite to the oxidized subgroup of CV chondrites cannot be excluded.

References: [1] Geiger T. et al. (1993) *Meteoritics 28,* 352 [2] Weisberg M. K. et al. (1996) *Meteorit. Planet. Sci. 31,* A150. [3] Zipfel J. et al. (2000) *LPS XXXI,* 1668.pdf. [4] Met. Bull. 87 (2003) [5] Ivanova M. A. et al. (2003) *LPS XXXIV,* 1226.pdf.