**MONT DIEU A IIE NON-MAGMATIC IRON METEORITE WITH CHONDRULES**

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The ~450 kg fragment of the Mont Dieu iron meteorites at the Museum of the Royal Belgian Institute of Natural Sciences has further been characterized, with special focus on the silicate inclusions. As the original fragments in the collection of the Musée National d'Histoire Naturelle in Paris show much more rust damage [1, 2], the good state of preservation of this large fragment provides a unique way to study the Mont Dieu meteorites. Recently, Mont Dieu II was classified as a fine octahedrite IIE iron meteorite [3]. The metal phase shows a clear widmanstätten texture, composed essentially of kamacite, with fine lines of Ni-rich taenite, and locally troilite associated with schreibersite [3].

The presented study focuses on the abundant large, rounded, greenish silicate inclusions present in Mont Dieu. These inclusions are mainly composed of olivine (~ $SiO_2$: 39.7 wt%, FeO: 15.8 wt%, MgO: 43.2 wt%, MnO: 0.4 wt%), pyroxene (~$SiO_2$: 60.0 wt%, FeO: 9.3 wt%, MgO: 31.2 wt%, MnO: 0.4 wt%, CaO: 0.9 wt%, $Al_2O_3$: 0.2 wt%, $TiO_2$: 0.1 wt%) and plagioclase (~ $SiO_2$ : 64.6 wt%, $Al_2O_3$: 21.1 wt%, $Na_2O$: 9.3 wt%, $K_2O$: 0.9 wt%, FeO: 0.8 wt%, CaO: 2.7 wt%), with chromite, troilite, schreibersite, (chlor)apatite and metal as minor mineral phases. The bulk composition has also been determined with ICP-OES and ICP-MS. Large chondrules (0.8-1.5 mm) are present in the examined inclusions, of which two are barred olivine chondrules. This feature appears unique in non-magmatic iron meteorites. The inner part of the chondrules consists mainly of olivine (~ $SiO_2$: 41.3 wt%, $Fe_2O_3$: 16.3 wt%, MgO: 40.7 wt%, MnO: 0.26 wt%), pyroxene (~$SiO_2$: 58.3 wt%, $Fe_2O_3$: 9.7 wt%, MgO: 30.6 wt%, MnO: 0.21 wt%, CaO: 0.79 wt%, $Al_2O_3$: 0.04 wt%, $TiO_2$: 0.03 wt%), plagioclase (~$SiO_2$: 65.9 wt%, $Al_2O_3$ : 20.7 wt%, $Na_2O$: 8.2 wt%, $K_2O$: 0.88 wt%, $Fe_2O_3$: 1.6 wt%, CaO: 2.4 wt%) and troilite, crossed with metal veins. The chondrules are surrounded by troilite, (chlor)apatite, metal, chromite and schreibersite. The fayalite and ferrosilite molar contents of the seven chondrules are similar to those observed in H-type ordinary chondrite that have been linked to IIE NMI based on their oxygen isotopic compositions [4]. Due to the presence of obvious chondrules in the silicate inclusions, Mont Dieu can be considered as part of the Netschaëvo class within the IIE group. Based on these characteristics, the Mont Dieu II meteorite promises to provide more insight in the further understanding of the IIE NMI formation process.

**References:** [1] Grossman, 1997, *Meteoritics & Planetary Science*, Supp. 31, p. A159-166. [2] Desrousseaux et al, 1996, *Meteoritics & Planetary Science*, 31:A36. [3] Van Den Borre et al, 2007, *Meteoritics & Planetary Science*, 42:A153. [4] Olsen et al, 1994, *Meteoritics*, 200-213.