

THE TWANNBERG, SWITZERLAND IIG IRON: NEW FINDS, CRE AGES AND A GLACIAL SCENARIO

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Introduction: The first mass of Twannberg (TWI; 15'915 g [1]) was found 1984 in an area marking the limit of the Rhône Valley glacier during the last ice age. Two additional masses (TWII: 2246 g, TWIII: 2533 g) were recovered in 2000 and 2005 on the attic of an old house and in an old mineral collection, respectively. Both locations are within a few km of the original find site. After discovery of the second mass a reinvestigation and comparison with the first mass was initiated.

Mineralogy and weathering: As the original find, the newly recovered masses consist of single crystals of kamacite with skeletal, up to 4.5 cm long and a few mm wide inclusions of schreibersite (10.5 wt% Ni). Fracturing follows a second generation of rhabditic schreibersite (17.2 wt% Ni) occurring as very large (several cm) and thin (20 μ m) plates. Bulk phosphorous contents based on schreibersite abundance are 1.7 wt% (TWI) and 0.85 wt% (TWII). Troilite is rare. All three masses are covered by a thick rind of oxides containing numerous inclusions of silicate sand grains, identical to those occurring in local glacial till of the Rhône glacier. Fractures following rhabdite plates allow local deep penetration of oxidation products.

Noble gases and CRE ages: Noble gas analyses of TW I and II yielded similar results, confirming pairing. ⁴He/²¹Ne ratios indicate stronger shielding for TW I than for TW II. CRE ages of 14.4 ± 7.0 (TWI) and 13.0 ± 3.0 Ma (TWII) are atypically low for iron meteorites.

Cosmogenic radionuclides: Activities of ¹⁰Be and ²⁶Al are much lower (by a factor of 40) than those typically encountered in small iron meteorites. The low values are most likely due to heavy shielding.

Discussion: Twannberg is a large meteorite with an unusually young CRE age. During weathering, different meteorite fragments resided in glacial till of the Rhône glacier, as indicated by terrestrial mineral grains in the oxide rind. The meteorite fragments were glacier transported for an unknown distance from their location of fall during one or several cold periods.

References: [1] Graham A.L. 1986. *Meteoritics* 21:309-313.