

CLASSIFICATION OF FOUR NEW IRONS, INCLUDING COMMON (IIAB) AND UNCOMMON (IIIF, UNUSUAL IAB) TYPES

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Introduction: Petrographic and INAA methods were used to classify four new irons, which include common and uncommon types.

Fitzwater Pass: This small (~65 g) iron from Oregon (U.S.A), only the sixth meteorite from this relatively large state, was found on a remote mountaintop ~5 km from the California border in 1971. It has a rough, blocky and lineated surface texture, which appears to reflect the internal Widmanstätten structure. It is a coarse octahedrite with bandwidth 1.44 ± 0.29 mm. Elemental concentrations suggest a Group IIIF designation, an uncommon type. This is the same designation as for Klamath Falls, which was found ~78 km to the northwest. However, the two meteorites are probably not paired, as Klamath Falls has a smaller kamacite bandwidth (0.5 mm), and concentrations for Ir, Pt, and Re that are ~0.002x, ~0.12x, and ~2.8x the respective values in the new iron.

Tamarack: This iron, consisting of two small specimens (16 and 25 g), was found in 2004 shallowly buried in soil on a hilltop in western Idaho (U.S.A). The specimens have prominent regmaglypts and are largely coated by reddish rust stains and a dull brown weathering patina, but apparent fusion crust is visible on sharp edges. The meteorite is a coarsest octahedrite with an apparent bandwidth of ~3 mm. Element concentrations suggest a group IIAB designation, a common type.

NWA 4861: Cut and etched faces of this iron (~2.4 kg) have a striking appearance, with tapering kamacite spindles ranging from ~2-32 mm long and ~0.5-1.5 mm wide, set in a taenite-rich, fine-grained (ataxitic) groundmass. The spindles display three orientations on cut surfaces, as in an octahedrite, indicating that the meteorite is a plessitic octahedrite. Coarse schreibersite is present, including acicular grains up to 25 mm long, which are surrounded by swathing kamacite. Elemental concentrations suggest assignment to the IAB complex, similar to subgroup sHL (high Au/Ni) of Wasson and Kallemeyn [1], except that the new iron is significantly enriched in Ga and Ge (by ~4x and ~10x, respectively) compared to other IAB-sHL members. These large discrepancies, especially for Ga, significantly exceed our likely uncertainty based on analyses of an Odessa internal standard and the previous two meteorites in the same run. NWA 4861 is best classified as an ungrouped member of IAB related to subgroup sHL.

Cruz del Eje: This large iron (~14 kg) was found just outside of the town of Cruz del Eje, Argentina, in 1971. The meteorite is a coarsest octahedrite dominated by irregularly shaped kamacite grains with grains >3.3 mm across. Most elemental concentrations are similar to those reported for the IAB main group [1], except that the concentration of Ga is lower by ~50% and that of Ge is lower by ~60%. The meteorite could belong to IAB main group if these determinations are in error.

References: [1] Wasson J.T. and Kallemeyn G.W. 2002. *Geochimica et Cosmochimica Acta* 66:2445-2473.