

THE ISCHGL METEORITE: FINDING CIRCUMSTANCES, MINERALOGY AND BULK CHEMISTRY

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Ischgl is the seventh meteorite named after an Austrian finding site. It was found in June 1976 on a mountain road about 2 km NW of the Tyrolean town Ischgl at an altitude of ca. 2000 m above sea level. According to the finder, a single fist-sized black stone had been fallen out of the snow of an avalanche. He took the unusual stone to his home and kept it for more than thirty years. In 2007, the finder brought his find to the University of Innsbruck, where its meteoritic nature was confirmed. In 2011, the stone was acquired by the Natural History Museum, Vienna, and subsequently officially classified as a LL6 chondrite (BRANDSTÄTTER et al., 2013). The meteorite was investigated by a variety of techniques including optical microscopy, analytical SEM, SEM-CL, EMPA, and INAA. Macroscopically, the meteorite, weighing 710 g, is to a large extent fusion-crust and exhibits well-developed regmaglypts. Its interior is a uniform light-grey colored rock without any distinct clasts and shows only minor signs of terrestrial weathering. Microscopically, the meteorite is a monomict breccia consisting predominantly of coarse-grained mm to cm-sized clasts set in a finer-grained breccia matrix. Clasts and matrix are strongly recrystallized and only a few relic chondrules were encountered. Olivine, orthopyroxene and plagioclase are the main silicates. Other minerals include clinopyroxene, chlorapatite and whitlockite. The opaque phases consist predominately of nickel-iron, troilite, and chromite. In addition, ilmenite and native copper occur as rare constituents. Compositionally, all mineral phases are consistent with the classification of the Ischgl meteorite as LL6 chondrite. Olivines and orthopyroxenes are equilibrated with average compositions of $\text{Fa}_{28.9}$ and $\text{Fs}_{23.8}\text{Wo}_{2.1}$ respectively. Plagioclase feldspar ($\text{Ab}_{85}\text{An}_{10}\text{Or}_5$) is oligoclase. The compositions of the Ca-phosphates are in the range reported for equilibrated ordinary chondrites (JOLLIFF et al., 2006). Averaged compositions of the nickel-iron metal phases kamacite (4.42 wt. % Ni, 3.37 wt. % Co) and taenite (38.84 wt. % Ni, 1.10 wt. % Co) agree well with the compositions reported for these phases in LL chondrites (AFIATTALAB & WASSON, 1979). Bulk chemical compositions for 34 major and trace elements were performed for two samples of the Ischgl meteorite. A comparison of these INAA data with the mean bulk concentrations reported by KALLEMEYN et al. (1989) for LL6 chondrites shows an excellent match.

AFIATTALAB, F., WASSON, J.T. (1980): *Geochim. Cosmochim. Acta*, 44, 431-446.

BRANDSTÄTTER, F., KONZETT, J., KOEBERL, C., FERRIÈRE, L. (2013): *Ann. Naturhist. Museum Wien, Serie A*, 115, 5-18.

JOLLIFF, B., HUGHES, J.M., FREEMAN, J.J., ZEIGLER, R.A. (2006): *Am. Mineral.*, 91, 1583-1595.

KALLEMEYN, G.W., RUBIN, A.E., WANG, D., WASSON, J.T. (1989): *Geochim. Cosmochim. Acta*, 53, 2747-2767.