

Lake Machattie, a weathered H5 chondrite find from Queensland, Australia

T. J. MCCOY* AND KLAUS KEIL*

Department of Geology, Institute of Meteoritics, University of New Mexico, Albuquerque, NM 87131 USA

(Received 1 May 1989; accepted in revised form 17 October 1989)

Abstract—Lake Machattie is an H5a chondrite find. The 2.6-kg stone is heavily weathered; unoxidized metal occurs only as 10- μ m-size blebs enclosed in olivine.

A SINGLE 2.6-KG STONE was recovered in May, 1988, near Lake Machattie in Queensland, Australia (approx. coordinates 24°50'S, 139°48'E). The anonymous finder observed the stone along a road in an area where rocks of this size are rare. A piece of the stone appears to have been broken off, but an extensive search of the surrounding area revealed no additional specimens. One polished thin section (UNM 940) and a 17 g slice are in the collection of the Institute of Meteoritics, University of New Mexico. The main mass is in the Robert Haag Collection, Tucson, Arizona.

The Lake Machattie meteorite is a heavily weathered H5a chondrite. Metallic Fe,Ni and most of the troilite are converted into hydrated iron oxides of terrestrial origin. The only fresh metallic Fe,Ni grains are droplet-like, 10- μ m objects that are enclosed in olivine. Unweathered troilite islands are observed in large troilite grains that are only partially weathered into oxides. Thus, as is the case in many other weathered chondrites, troilite in the Lake Machattie meteorite is more resistant to terrestrial weathering than is metallic Fe,Ni. H group classification is indicated by the mean compositions of olivine ($\text{Fa}_{18.8}$, $\sigma = 0.27$, $n = 25$) and low-Ca pyroxene ($\text{Fs}_{16.9}$, $\sigma = 0.21$, $n = 14$) which are close to those for equilibrated H group chondrites (Gomes and Keil, 1980). Classification as petrologic type 5 is based on poorly delineated chondrule boundaries, recrystallization of chondrule mesostases, the occur-

rence of granoblastic feldspar ($> 15 \mu\text{m}$), the only very rare occurrence of polysynthetically twinned clinopyroxene, and the mean Wo content of low-Ca pyroxene of 1.4 mol.%, which is within the range for most type 5 chondrites of 1.2–1.6 mol.% (Scott *et al.*, 1986). Shock facies "a" is indicated by the presence of fractured olivine with sharp extinction (Dodd and Jarosewich, 1979).

Acknowledgements—We are most grateful to Mr. Robert Haag for making the sample available to us. This work was supported in part by the National Aeronautics and Space Administration, grant NAG 9-30 to K. Keil.

Editorial handling: A. L. Graham.

REFERENCES

- DODD R. T. AND JAROSEWICH E. (1979) Incipient melting in and shock classification of L-group chondrites. *Earth Planet. Sci. Lett.* **44**, 335–340.
- GOMES C. B. AND KEIL K. (1980) *Brazilian Stone Meteorites*. Univ. of New Mexico Press. 161 pp.
- SCOTT E. R. D., TAYLOR G. J. AND KEIL K. (1986) Accretion, metamorphism, and brecciation of ordinary chondrites: Evidence from petrologic studies of meteorites from Roosevelt County, New Mexico. *Proc. Lunar Planet. Sci. Conf.* **17th**, E115–E123.

* New address: Planetary Geosciences Division, Hawaii Institute of Geophysics, University of Hawaii at Manoa, Honolulu, HI 96822, USA.