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Huntite from Deer Park, Victoria, Australia

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Abstract

Huntite, $Mg_3Ca\,(CO_3)_4$, has been found in weathered basalts at Deer Park near Melbourne, Victoria, Australia. An account is given of its occurrence, and its diffraction pattern, weight loss and differential thermal curves are recorded.

Huntite, $Mg_3Ca\,(CO_3)_4$, was recognized as a new mineral by Faust (1953) and since that time it has been reported on a number of occasions from different countries and with a variety of origins. In Australia, Skinner (1958) reported it as a weathering product in the Proterozoic, Torrens Dolomite, near Tea Tree Gully, South Australia. It has now been found in weathered basalts at Deer Park, a western suburb of Melbourne, Victoria.

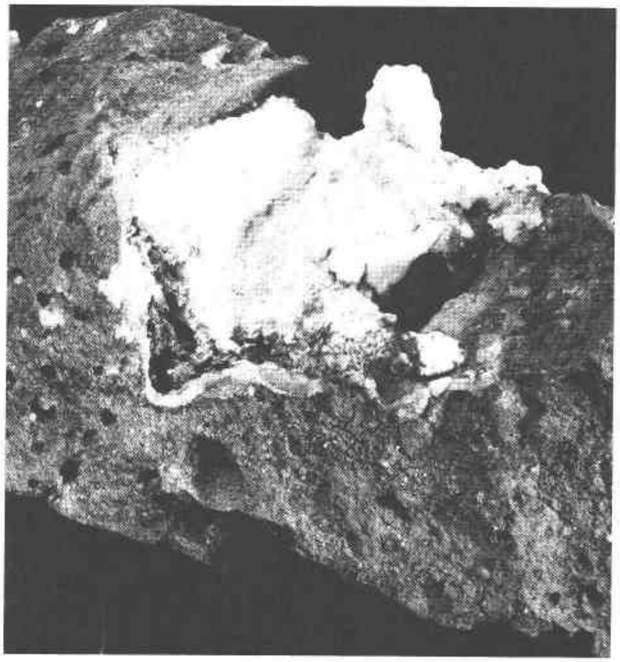

FIG. 1. Basalt containing white huntite in vesicles, the walls of which are lined with magnesite.

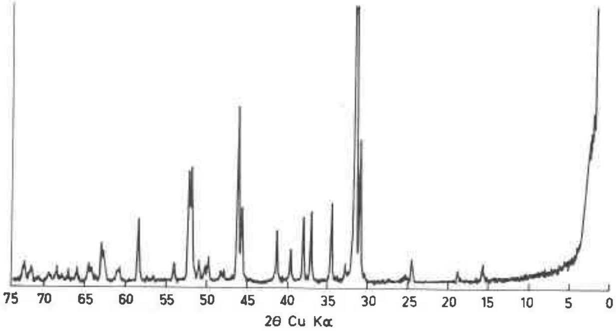

FIG. 2. X-ray diffraction pattern of huntite from Deer Park.

The basalts at Deer Park are part of the "newer basalts" which poured out over a greater part of Victoria in late Tertiary and Pleistocene times. They are exposed in two quarries from which rock is being won for concrete aggregate and road-making purposes. These basalt flows took place towards the end of the vulcanism and form part of a series of flows nearly 60 m thick between some of which there was a considerable interval of time. The upper part of the flow at Deer Park is gray in color and vesicular and can be described as an iddingsite basalt in which the olivine of the basalt has been altered to iddingsite at a late stage in the emplacement of the flow. The lower part of the flow is a dark green basalt in which the olivine and glass have also been deuterically altered to a green clay mineral. The boundary between gray and green basalt is very irregular and is usually marked by a transitional zone where the clay mineral of the green basalt has been oxidized. Overlying the basalt is a soil zone approximately 2.5 m thick that has at its base a discontinuous layer of magnesite nodules. Underlying it there is an extensive development of soil on an underlying basalt flow and a considerable development of hardened magnesite nodules about one meter below the surface of the fossil soil. The clay of the fossil soil has the appearance of being heated, and in the magnesite layer it frequently occurs as dried aggregates encased in a

TABLE 1. Chemical Analyses of Huntite

	Deer Park Victoria	Currant Creek Nevada	Molar Ratios	
			Deer Park	Currant Creek
MgO	33.0	34.09	3.06	3.07
CaO	15.0	15.42	1.00	1.00
MnO	0.01	0.001		
H_2O^+	1.30	0.86		
H_2O^-	1.00	0.47		
CO_2	47.8	48.85	4.07	4.03
SiO_2	0.20	0.06		
Al_2O_3	nd	nil		
Fe_2O_3	0.01	nil		
FeO	nd	nil		
TiO_2	nd	nil		
SO_3	< 0.01	nil		
P_2O_5	0.015	nd		
Cl	0.90	nd		
Total	99.25	99.75		

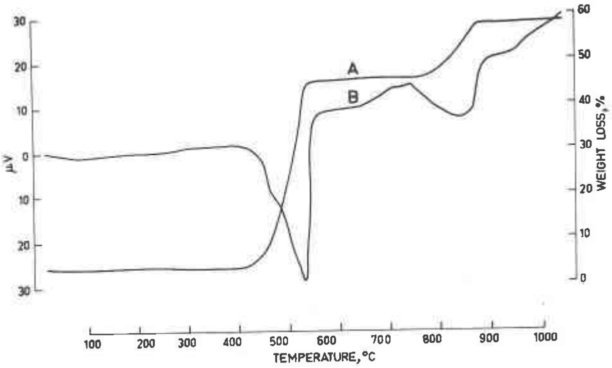

FIG. 3. Combined weight loss (A) and differential thermal analysis (B) curves of huntite from Deer Park.

honeycomb of magnesite and dolomite. The carbonate honeycomb has resulted from the replacement of a weathered vesicular basalt by hot solutions. The soft white huntite is frequently found coating the magnesite-clay honeycombs. In the weathered underlying basalt flow it also occurs in vesicles, the walls of which are lined with magnesite (Fig. 1). Another main occurrence is in the form of white nodules several inches in diameter in the unconsolidated red clay of the indurated fossil soil. It is also found as small nodules in narrow vertical clay seams in the upper gray and green basalt flow currently being quarried. The occurrence of the huntite is consistent with its having been precipitated from cold descending solutions rich in Ca, Mg, and carbonic acid.

The huntite was originally recognized from its X-ray diffraction pattern, the diffractometer trace of which is shown in Figure 2. This pattern is in good agreement with the pattern given on ASTM card 6-0462 for the type material from Currant Creek, Nevada. A chemical analysis performed by the Australian Mineral Development Laboratories (Table 1) confirmed that the material is a mixed carbonate with 3 molecules of $MgCO_3$ to one of $CaCO_3$. The analysis is compared in Table 1 with that given for the type material by Faust (1953). When huntite is heated, it dissociates into two parts. The dissociation of the $MgCO_3$ molecule takes place at about 570°C and that of the $CaCO_3$ at about 850°C. This is illustrated in Figure 3 which shows combined weight loss, differential thermal analysis curves for the Deer Park material run at 10°C/min on Rigaku Denki equipment.

Acknowledgments

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References

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SKINNER, B. J. (1958) Huntite from Tea Tree Gully, South Australia. *Am. Mineral.* **43**, 159–162.

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