GREEN LAZULITE FROM STODDARD, NEW HAMPSHIRE*

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ABSTRACT

Lazulite found in Stoddard, New Hampshire, is unusual because of its dark-green color, high indicies of refraction, 1:1 iron-magnesium ratio, and polysynthetic twinning. *X*-ray photographs show the New Hampshire material to be identical in structure to blue lazulite from Kern County, California.

INTRODUCTION

A dark green variety of lazulite, at first believed to be apatite, is present in a small vein exposed on the southwest side of Jackson Hill in the northwest corner of the town of Stoddard, Cheshire County, New Hampshire.

A routine check on the mineral indicated that it was a variety different from those described in the *System of Mineralogy* (1) and by Meixner (3), so data on the New Hampshire material are presented here.

The vein is exposed for a distance of 70 feet, and varies in width from 6 to 18 inches. It strikes N 60° E and dips 45° to the northwest, and is enclosed in a mica schist in which the vertical foliation strikes N 42° E. The vein consisted largely of quartz and muscovite with irregular masses of lazulite up to three inches in diameter and a few tabular crystals of columbite-tantalite.

CHEMICAL ANALYSIS

The first clue to the identity of the green lazulite was obtained from an analysis of the mineral given in Table 1. The analysis is similar to published analyses, but the ratio of iron to magnesium is unusually large (1:1 molecularly).

TABLE 1. CHEMICAL COMPOSITION OF HIGH IRON LAZULITE

	1	2	3
MgO	6.45	.160	1
FeO	11.58	.161	1
Al_2O_3	31.83	.318	2
H_2O	5.19	.288	1.8
P_2O_5	45.10	.318	2
	100.15		

1. Analysis by F. A. Gonyer.
2. Weight percentages divided by molecular weight.
3. Oxide ratios.

* Contribution from the Department of Mineralogy and Petrography, Harvard University, No. 297.

X-Ray Data

A comparison of the x-ray powder photographs of the dark green New Hampshire material with blue lazulite from Kern County, California, shows that the two are identical in structure. However, the data in Table 2 differ considerably from that given by Kerr (2) for material from White Mountain, California.

Table 2. Interplanar Distances and Estimated Intensities of New Hampshire and California Lazulite

Lazulite, Stoddard, N. H. Cu Radiation, Nickel Filter		Lazulite, White Mountain, California	
d	*I*	*d*	*I*
4.64	1	6.13	2
3.20	10	4.79	2
3.16	4	3.15	10
3.10	4	2.59	4
3.035	4	2.265	4
2.525	5	2.000	5
2.335	1	1.825	4
2.242	3	1.770	1
2.200	3	1.705	2
2.040	1	1.640	4
1.987	4	1.568	5
1.965	4	1.420	3
1.794	1	1.340	1
1.778	1	1.285	4
1.604	3	1.255	0.5
1.588	3	1.190	2
1.554	8	1.120	1
1.526	4	1.085	0.5
1.430	1	1.035	0.5
1.402	2	.997	1
1.380	1		
1.265	6		
1.177	1		
1.106	1		
1.087	1		

Physical Properties

A number of physical properties of the New Hampshire material differ from those obtained from lazulite elsewhere. Some of its optical properties are different, presumably because of the unusually high percentage of iron. A summary of the optical properties is as follows:

$n_{Na} \pm 0.001$	
$\alpha = 1.634$	Opt. (−)
$\beta = 1.659$	$2V = 63°$
$\gamma = 1.668$	$r < v$, moderate
Pleochroism	
X = Yellow	
Y = Yellowish green	
Z = Bluish green	

Thin sections of the material showed well-defined polysynthetic twinning. Parting has developed along the twin planes.

Acknowledgment

The identification and determination of some of the characteristics of the high iron lazulite were made possible by Professor Esper S. Larsen of Harvard University who provided the analysis, laboratory facilities, and friendly counsel.

References

(1) Dana, Edward S., A System of Mineralogy, Sixth Edition (**1915**).
(2) Kerr, Paul F., The occurrence of andalusite and related minerals at White Mountain, California: *Economic Geology*, **27,** 614–643 (1932).
(3) Meixner, Heinz, Das Mineral Lazulith und sein Lagerstattentypus: *Berg und Hüttenm. Jahrb.*, Bd. **85,** Heft 1/2, 1–22, 33–49 (1937).