

NOTES AND NEWS

LAMPROBOLITE, A NEW NAME FOR BASALTIC HORNBLENDE

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In recent years the amphibole with high ferric iron content, high indices of refraction, and rather strong to extreme birefringence has often been regarded as a distinctive mineral of the group under the name basaltic hornblende. Weinschenk, Johannsen, Tickell, Schmidt and Baier, Chudoba, Angel and Scharizer, Rogers and Kerr, and probably others have so considered it. Many petrographers working on the detrital minerals of oil-field sediments have listed it separately from ordinary hornblende.¹ There are cogent reasons for separating it from common hornblende. In addition to the differences mentioned above, it has strong pleochroism, a small extinction angle ($c \wedge \gamma = 0$ to 10°), subadamantine luster, and usually a short prismatic habit. It is easily distinguished from common hornblende of brown color in both thin sections and crushed fragments.

Next let us consider the name for the particular amphibole in question. The term basaltic hornblende is unsatisfactory for three reasons: (1) It is a double name and too long. The tendency for sometime has been to reduce double names of minerals to single names; for example, nitratine was introduced to replace "soda niter." (2) It is by no means limited to basalts and basalt tuffs, but is common in other kinds of extrusives, such as trachytes, andesites, auganites, basanites, tephrites, and the corresponding tuffs. (3) It is not strictly speaking a hornblende, that is to say, hornblende in my opinion should be defined so as to exclude basaltic hornblende. If this be done, then "hornblende" replaces "common hornblende" and thus another double word is eliminated from the list of mineral species.

What other names have been used for this interesting amphibole? Kirwin, early English mineralogist, introduced the name "basaltine" for basaltic hornblende, but in recent years Milner,² as far as I know, is the only one who uses the term. According to Chester,³ basaltine (von Born, 1790) is a synonym of augite, but it has also been used as a general term to include both basaltic hornblende and basaltic augite. It is obviously not a suitable name for the mineral under discussion.

¹ For example, it had a place on the printed sheets "Heavy Mineral Determinations" used by the late Dr. Ralph D. Reed in the Research Laboratory of the Marland Oil Co. in San Francisco about 1925.

² *Sedimentary Petrography*, 3d ed., p. 250, London (1940).

³ *Dictionary of the Names of Minerals*, p. 27, Wiley, New York (1896).

In 1932 Winchell⁴ proposed the term "oxyhornblende" as a substitute for basaltic hornblende. Barnes,⁵ working under Winchell's direction, proved conclusively that ordinary green hornblende is changed to a brown substance much resembling basaltic hornblende. The ferrous iron is oxidized to ferric iron by a loss of hydrogen (rather than by gain of oxygen) without destruction of the space lattice. The results brought about by heating common green hornblende have been known for half a century, but it remained for Barnes to determine the true nature of the change.

It was suggested by Miers⁶ that the properties of basaltic hornblende are "acquired characters." This point has been emphasized by Winchell, and the evidence now seems to be complete that basaltic hornblende is formed from ordinary hornblende by a partial oxidation of the iron. The writer⁷ has expressed the opinion that this oxidation was brought about by "hot gases at a late stage in the magmatic history." But whatever its origin may be, the properties of basaltic hornblende are sufficiently characteristic for it to be regarded as a distinct mineral. Winchell's name, as well as the name basaltic hornblende, implies that it is a mere variety of hornblende.

The writer proposes the name *lamprobolite* (lam-pro-bōl'ite) for the amphibole under discussion. It is derived from the Greek λαμπρός, shining or lustrous, and βολίς, a missile. The stem, *lampro-*, appears in the mineral names, lamprophyllite, lamprophanite, and chalcolamprite, and in the rock name, lamprophyre. The stem *bolid-* is found in bolide (a brilliant meteor). The shortened form *bol-*, however, is preferable for compounding and is suggested by the stem found in amphibole. The new name is appropriate since crystals of the mineral have high vitreous or subadamantine luster (especially on fresh cleavage surfaces) lacking in other amphiboles, and since the most typical specimens such as those from the basaltic tuffs of the Bohemian Mittelgebirge⁸ (Lukow is a prominent locality) are volcanic ejectamenta.

For a mineral which has been known for more than a century, one hesitates to give an entirely new name unrelated to previous names. But while lamprobolite is a distinctive name, its sound especially suggests that it may be an amphibole.⁹ The accent on the third syllable (lam-probol'ite) will distinguish it from amphibolite (am-fib' o-lite).

⁴ *Am. Mineral.*, **17**, 472-473 (1932).

⁵ *Am. Mineral.*, **15**, 393-417 (1930).

⁶ *Mineralogy*, p. 427, Macmillan, London (1902).

⁷ *Introduction to the Study of Minerals*, 3d ed., p. 455, McGraw-Hill, New York (1937).

⁸ Hibs, J. E., *Die Minerale des Böhmisches Mittelgebirges*, Gustav Fischer, Jena (1934).

⁹ The variant, lamprobole, though more euphonious, is too much like amphibole and might easily be confused with it.

Synonyms from the time of Werner to the present are listed here, but there may be others that have been overlooked.

SYNONYMS OF LAMPROBOLITE

Basaltische hornblende, Werner (1789).
 Basaltine, Kirwan (1794).
 Amphibole cristallisée, Haiiy (1801).
 Amphibolus basalticus, Breithaupt (1820) (?).
 Hornblende ferrifère, Lévy and Lacroix (1888).
 Oxyhornblende, Winchell (1932).
 Lamprobolite, Rogers (1940).

In this compilation, the excellent work of Hibschi,¹⁰ doubtless to become a classic, has been very useful.

DATA FOR LAMPROBOLITE¹¹

Monoclinic prismatic class.

Usual forms: $m\{110\}$, $b\{010\}$, $r\{111\}$, $p\{101\}$. Twin-plane = $\{100\}$.

Habit: usually short prismatic.

Cleavage parallel to $m\{110\}$. $(110 \wedge 1\bar{1}0) = 55^\circ 42'$ (St. Kreutz).

Color: black, but translucent brown on thin edges.

Luster: high vitreous or subadamantine.

Axial plane = $\{010\}$, $c \wedge \gamma = 0$ to 12° (in the obtuse angle β); $2V = 64^\circ$ to 80° . Opt. (-).

Pleochroism strong; α = light yellow, β = brown, γ = dark red-brown; $\gamma > \beta > \alpha$.

Indices: $n_\alpha = 1.670$ to 1.692 ; $n_\beta = 1.683$ to 1.730 ; $n_\gamma = 1.693$ to 1.760 .

Birefringence: $n_\gamma - n_\alpha = 0.026$ to 0.072 .

Occurrence: In mediosilicic to subsilicic volcanic extrusives and the corresponding tuffs.

Also as a detrital mineral.

Origin: Formed from common hornblende by the partial oxidation of iron which is probably due to hot gases at a late magmatic stage.

In conclusion, I must record my obligation to my colleague, Professor Raymond D. Harriman of the Department of Classics, for his interest in the new name here proposed. Like many another scientist I have had "small Latin and less Greek."

¹⁰ *Op. cit.*

¹¹ According to St. Kreutz (in Hibschi, *loc. cit.*, p. 99) the variability in the optical properties of basaltic hornblende is due to variation in the oxidation of the iron.