

THE MATA DO LENÇO MICA-RICH KIMBERLITE, WESTERN MINAS GERAIS.

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General

Many Cretaceous kimberlite-like intrusions occur in the Monte Carmelo region in the vicinity of the Alto Paranaíba arch. The Mata do Lenço intrusion (MLI) intrusion is a new discovery of this type but is distinguished from the others for by being extremely rich in mica. Fresh outcrops of the MLI can be observed in the roadside near the gate to the Mata do Lenço farm, 3 km northwest of Morro Vermelho, near the town of Abadia dos Dourados.

The MLI is a small ellipsoidal intrusion, about 50 m in diameter and has intruded mica-schists and banded iron formations of the Araxá Group - a highly deformed Proterozoic meta-volcanic/sedimentary sequence of the Brasília belt. The rock constituting the MLI is massive dark and porphyritic with a trachytic texture and local flow structures. It consists of macrocrysts of olivine, phlogopite and enstatite set in a fine grained matrix of olivine, phlogopite, diopside, perovskite, richterite spinel and glass. Possible leucite need to be confirmed.

Xenoliths recognized in the MLI are:

- a) Glimmerites, including a possible MARID rocks.
- b) Harzburgites and dunite.
- c) Local Araxá Group country rocks.

Macrocrysts

Macrocrysts of olivine, phlogopite and enstatite occur. The phlogopites reach a maximum size of 5 mm and show wavy extinction, kink bands, opaque exsolution lamellae and reaction rims. Olivine xenocrysts and phenocrysts, reach maximum grain size of 2.0 mm. Xenocrysts usually show wavy extinction and xenomorphic habit. Phlogopite and serpentine are common alteration products of olivine. Enstatite macrocrysts up to 0.5 mm, are strongly fractured and show deformation lamellae and wavy extinction.

Matrix

The fine grained matrix displays an inequigranular texture with some areas showing poikilitic features as well as trachytic texture. It consists of thin laths of diopside, olivine microphenocrysts, phlogopite associated with minor richterite, poikilitic phlogopite, perovskite, spinel, and possibly analcime replacing leucite and glass.

Bulk Chemistry

The MLI when compared to ultrabasic, ultramafic rocks, and kimberlites (Table 1), has a high concentration of K₂O, CaO, Al₂O₃, Fe₂O₃, P₂O₅ and low SiO₂. It has a high K₂O/Na₂O (4.64) and Fe₂O₃/FeO (7.95) values and low MgO/(FeO + Fe₂O₃) (1.62) ratio. The overall chemistry matches well the average values for Group II Kimberlites, except for very

TiO₂ in MLI. However, the presence of richterite, leucite and glass, if substantiated, will preclude the MLI being a kimberlite.

References

- BERGMAN, S.C. 1987. Lamproites and other potassium-rich igneous rocks: A review of their occurrence, mineralogy and geochemistry. Proceedings of the Conference on Alkaline Igneous Rocks, Edinburgh. Geological Society of London Special Publication, in press.
- DAWSON, J.B., SMITH, J.V. 1977. The MARID (mica-amphibole-rutile-ilmenite-diopside) suite of xenoliths in kimberlite. *Geochim Cosmochim Acta* 41: 309-323.
- DAWSON, J.B. 1980. *Kimberlites and their xenoliths*. Berlin, Springer-Verlag. 252p.
- SMITH, C.B., GURNEY, J.J., SKINNER, E.M.W., CLEMENT, C.R. & EBRAHIM, N. 1985. Geochemical character of southern african kimberlites: a new approach based upon isotopic constraints. Transactions of the Geological Society of South Africa, 88, 267-280.

Table 1. Comparative data of MLI and ultrabasic, ultramafic, and kimberlites averages.

	(1)	(2)	(3)	(4)	(5)
(wt%)					
SiO ₂	40.60	43.20	37.31	35.20	31.10
TiO ₂	0.50	0.13	5.86	2.32	2.03
Al ₂ O ₃	0.85	2.70	6.90	4.40	4.90
Fe ₂ O ₃	—	—	10.26	—	—
FeO	12.60 *	8.34 *	1.29	9.80	10.50
MgO	42.90	41.10	18.73	27.90	23.90
MnO	0.19	0.13	0.15	0.11	0.10
CaO	1.00	3.80	8.51	7.60	10.60
Na ₂ O	0.77	0.30	0.73	0.32	0.31
K ₂ O	0.04	0.03	3.39	0.98	2.10
P ₂ O ₅	0.04	0.05	0.59	0.70	0.70
Ignition loss	0.04	—	5.49	10.70	13.00
TOTAL	99.08	99.98	99.17	100.03	99.64
(ppm)					
Cu			78	52	30
Ni			723	420	1400
Cr			1821	580	1800
Zn			89	84	60
Y			13	27	16
Zr			456	922	290
Pb			100	44	30
Be			4	—	—
Ba			1252	5120	3000
Sr			800	1530	1140
Co			107	87	85
V			170	123	85
Bi			—	—	—
Sn			41	—	—

(*) FeO + Fe₂O₃.

(1) Average for ultrabasic rocks (Vinogradov, 1962 in Dawson, 1980).

(2) Average for ultramafic rocks (Wedepohl, 1962, in Dawson, 1980).

(3) MLI (analyzed for ICP).

(4) Kimberlite average (Dawson, 1980; Bergman, 1987).

(5) Average for Group II Kimberlites (Dawson, 1980; Smith et al., 1985).