

# A PRELIMINARY NOTE ON THE MINERALOGY AND GEOCHEMISTRY OF THE ARIS PHONOLITE, SWA/NAMIBIA

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Phonolites and other alkaline volcanic rocks are well-known from the area between Windhoek and Rehoboth (170 E, 230 S) in central SWA/Namibia (Rimann, 1914; De Kock, 1933; Gevers, 1933; Ferreira *et al.*, 1979).

Recently Marsh (1987), has given an account of the phonolites from the Klinghardt Mountains in the south-western part of SWA/Namibia. He suggests that the latter occurrences, including those of the Windhoek-Rehoboth area, are part of the widespread Tertiary alkaline magmatism along the western margin of southern Africa between latitudes 25°30' and 35°S. (Marsh, 1987).

The highly vesicular phonolite from the Aris quarries (25km south of Windhoek) is essentially a fine-grained aphyric variety consisting of alkali feldspar, nepheline and acmite with minute accessory apatite, zircon and some monazite. The most common mineral in the vesicles is a well-crystallized natrolite which frequently forms large blebs. In addition, well-formed crystals of microcline and acmite are commonly seen, and rarely apophyllite and sphalerite have been observed. In places, the cavities contain radiating bundles of a fibrous, silky, yellow to brown mineral, which appears to be an unknown iron silicate. Two rather rare minerals, eudialyte Na, (Ca,Fe)<sub>2</sub>ZrSi<sub>6</sub>O<sub>17</sub>(OH,Cl)<sub>2</sub> and makatite NaSi<sub>2</sub>O<sub>7</sub>(OH), H<sub>2</sub>O have also been noted. The former occurs as pink incrustations in thin veinlets and the latter as white fibres in veinlets or blebs replacing the phonolite. Eudialyte is a characteristic rare constituent of alkaline rocks.

Three whole rocks analyses of Aris phonolite are given in Table 1, together with the trace element contents (Table 2). These compare favourably with the results obtained for the phonolites from the Klinghardt Mountains by Marsh (*op. cit.*).

The Aris phonolite displays high values for thorium and uranium, which reflects the pronounced radioactivity observed at that locality.

## REFERENCES

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west of Rehoboth. *Z. Vulk.*, **14**, 288-296.

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TABLE 1: Whole-rock Analyses of Phonolites from Aris.

SAMPLE 1: Phonolite, Aris east quarry. Analytical Laboratories, Inst. of Mineralogy, Freie Universität, Berlin (Prof. Dr. W. Franke).

SAMPLE 2: Phonolite, Aris east quarry. X-ray Laboratories, Dept. of Earth Sciences, Leeds University (Dr. G. Hornung)

SAMPLE 3: Phonolite, Aris east quarry. X-ray Laboratories, Dept. of Earth Sciences, Leeds University (Dr. G. Hornung)

	Sample 1	Sample 2	Sample 3
SiO <sub>2</sub>	55.75	54.88	53.98
TiO <sub>2</sub>	0.16	0.17	0.19
Al <sub>2</sub> O <sub>3</sub>	20.12	20.89	20.45
Fe <sub>2</sub> O <sub>3</sub>	2.88	2.89	3.21
MnO	0.23	0.21	0.24
MgO	0.04	0.03	0.01
CaO	0.78	0.81	0.88
Na <sub>2</sub> O	10.21	10.22	11.34
K <sub>2</sub> O	5.16	5.13	5.22
P <sub>2</sub> O <sub>5</sub>	0.01	0.03	0.03
LOI	3.82	4.25	3.86
	99.16%	99.51%	99.41%

TABLE 2: Trace element analyses (ppm).  
Samples as for Table 1

	1	2	3
Rb	454	479	468
Sr	26	18	16
Ba	25	20	20
Sc	1	2	-
Y	38	35	37
La	207	313	307
Ce	202	267	269
Nd	-	64	67
Zr	1169	1346	1587
Hf	17	-	-
Th	147	188	203
V	5	5	6
Nb	274	425	476
Ta	1	-	-
Cr	1	-	-
W	191	-	-
Co	13	6	6
Ni	3	8	7
Cu	3	4	2
Zn	180	196	212
Ga	31	41	42
Sn	2	-	-
Pb	65	83	81
U	35	28	31