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Theralites around Pikkili, Dharmapuri District, Tamil Nadu

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Abstract

Theralites occur as autoliths in nepheline syenites around Pikkili (△2670′) in Dharmapuri District, Tamil Nadu. The theralites were emplaced first, followed by the intrusion of different varieties of nepheline syenites.

Introduction

Theralites are found to occur as autoliths in nepheline syenite around Pikkili, Dharmapuri District, Tamil Nadu (Long. 78°0′ and 78°05′ and Lat. 12°09′ and 12°47′). The trends of nepheline syenite and theralite autoliths vary from NNE-SSW to almost NE-SW.

Field relationships

Theralites are generally found as autoliths in the pink variety of nepheline syenite. The contacts between theralites and nepheline syenite are sharp. At places the nepheline syenite has cut the theralites breaking it into smaller fragments.

Theralites consit of phenocrysts of potash feldspar (perthite) measuring from a few cms to 5 cms. The oval and spindle shaped phenocrysts are mostly elongated in NE-SW direction.

Two sets of joints are observed (E-W dipping 35°S and NE-SW vertical joints). In some places, thin bands of pink syenite intrude along the joint planes.

Weathering of theralites is quite characteristic. Phenocrysts of feldspar stand out prominently.

Petrography

In hand specimens these are coarse to fine grained and are melanocratic rocks with porphyritic feldspar. Feldspars are orthoperthites. The mafics are mainly, pale green pyroxene-aegerine-augite ($2V = 59°Z \wedge c = 48°$), hastingsite and biotite. Nepheline occurs as subhedral grains. Polysynthetically twinned plagioclase (An_{25-28}) also occurs in small amounts. Sodalite, apatite, calcite and titaniferous magnetite occur as accessories.

Chemical analyses of the theralite is presented in column 1 in Table I. Analyses of different syenites, associated with the theralites are furnished in columns 2 to 5. The agpaitic nature is clearly indicated by the low alkali percentages compared to alumina.

Conclusion

The basic variants (mafic rich variety) and theralites represent the first phase of alkaline activity, followed by the emplacement of nepheline syenites of different types in the Pikkili area. The primary nature of theralite is clearly exhibited not only by its occurrence as autoliths in the nepheline syenites, but due to the parallel arrangement of the alkali feldspar phenocrysts along the direction of flow. The presence of plagioclase feldspar viz. albite indicates the subsolvus nature of the assemblage (Sorenson, 1974).

TABLE I

	1	2	3	4	5
SiO_2	51.02	46.39	51.16	54.98	55.89
TiO_2	1.16	2.92	2.25	0.72	0.51
Al_2O_3	17.32	17.59	20.19	20 89	21.71
Fe_2O_3	3.73	3.70	3.01	2.50	2.99
FeO	8.94	6 62	3.95	2 31	1 25
MnO	0.19	0.21	0.22	0.17	0.20
MgO	4.19	4.63	2.17	0.55	0 25
CaO	1.95	8.97	5.61	2.01	1 64
Na_2O	5.12	5.21	7.01	9.18	12 23
K_2O	5.45	2 89	3.89	5.23	2 35
H_2O	0 68	0.53	0 60	0 77	0 80
P_2O_5	—	—	—	0.21	—
	99.75	99.66	100 06	99.52	99 82
Orthoperthites	9 6	18.2	22.5	30 2	14.3
Plagioclase	1 2	25.9	37.6	33.6	48.9
Nepheline	4.5	15 0	16.1	25 2	27.7
Pyroxene	38.4	25.5	16 8	3.5	1.2
Amphibole	7 0	4.6	0 8	1.0	—
Biotite	34.5	—	—	—	—
Accessories	4.8	10 8	6 2	6 5	7.9

The varieties of leucocratic syenites which enclose and traverse the theralites are later intrusives. The close spatial association of these rocks indicates that they have been emplaced in quick succession.

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