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RESEARCH NOTE

A NOTE ON THE OCCURRENCE OF VANADIUM BEARING TITANIFEROUS MAGNETITE IN KRISHNARAJPET SCHIST BELT, KARNATAKA

In the course of investigation for gold and basemetals in Bellibetta (Lat. 12°38'15"N.: Long. 76°27'00"E.), in Krishnarajpet Schist belt, about 200 m. long and 20 m. wide, vanadium bearing titaniferous magnetite zone in metaultramafite was delineated. Similar lensoid bodies of limited extension occur within migmatite bordering the schist belt west of Krishnarajpet, around Harinhalli, Kamanahalli and Hosaholalu.

Vanadium bearing titaniferous magnetite of Bellibetta ridge occurs as cumulates in the talc tremolite schist of Komatiitic chemistry (up to 28% MgO) which is interbanded with mafics (hornblende schist) of tholeiitic composition in Krishnarajpet belt.

Two samples of vanadium bearing titaniferous magnetite have analysed the following elements :

Magnetite associated with talc tremolite schist Sample No. 1		Magnetite lumps within migmatised enclave Sample No. 2	
Fe	54.67 %	Fe	55.01 %
Ti	1.88 %	TiO_2	10.40 %
V	0.36 %	V_2O_5	1.30 %
Cr	464 ppm	Cr	400 ppm
Co	170 ppm	Co	150 ppm
Cu	60 ppm	SiO_2	2.05 %
Pb	20 ppm	Mn	0.83 %
Zn	160 ppm	Ni	800 ppm
Au	< 0.1 ppm		
Ag	< 5 ppm		

Sample 1 : Analysed by AAS method, Chemical Laboratory, A.M.S.E.Wing, G.S.I. Bangalore.

Sample 2 : Analysed by wet chemical method, Chemical Laboratory, A.M.S.E.Wing, G.S.I. Bangalore.

The ore microscopic studies of magnetite have shown that it is replaced by anhedral grains of haematite. Exsolved ilmenite in magnetite remains unaltered, though, the magnetite is martitised. Silicate gangue is present as interstitial material in the magnetite cumulate.

Haematite exhibits 'mat' texture resulting from profuse martitisation along cubic planes (100) of magnetite, which has been totally transformed into haematite. Ilmenite shows minute exsolved haematite lamellae along 0001 plane. Presence of goethite as a product of released iron is noticed along the periphery of silicates. Pyrrhotite and pyrite occur as tiny specks with gangue minerals. The vanadium bearing mineral is not separately represented and perhaps occurs in the lattice of magnetite. Substitution of V_2^+ in the place of Fe_3^+ in magnetite is suggested (Trojer, 1973). Both oxide and sulphide phases are

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represented as reflected in the above mineral assemblage and compare well with the similar occurrence in the adjoining Nuggihalli schist belt (Achuta Pandit, 1975).

Studies by Listner (1966) on the composition and origin of selected iron titanium deposits of both concordant and discordant types have shown, that, magnetite formed at an early stage of differentiation contains a greater amount of minor elements especially Cr, V than does magnetite formed at later stages. Similar studies on the Fe-Ti-V-O system for the titano-magnetite of eastern Bushveld complex by Klemm (1985) suggest enrichment of titanium in magnetite from the massive layers indicating that the magnetite crystallised under conditions of disequilibrium with the magma i.e. by spontaneous nucleation and rapid crystallisation. Lower vanadium values in the magnetites from the massive layers suggest crystallisation at higher f_{O2} (oxygen fugacity) than from the rocks containing disseminated magnetite.

In the context of magnetite occurrence of Krishnarajpet schist belt, in addition to high vanadium and chromium, the cumulate texture is also indicative of an early magmatic seggregation.

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CORRIGENDUM

In the Reply to comment on p. 480, l.20 of v. 43(4), 1994 of the Jour. Geol. Soc. India, please read: 1.7, 2.3 and 3.3 mm/yr instead of 1.7, 2.3 and 3.3 cm/yr.