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On the use of the term 'Agpaitic'

THE use of 'agpaitic' has undergone considerable change since its introduction by Ussing (1911) for rocks of the Ilímaussaq complex in south-west Greenland (Fersman, 1929; Goldschmidt, 1930, 1954; Polanski, 1949; Gerasimovskii, 1956, 1968; Zlobin, 1959; and Sørensen, 1960). This note is to urge petrologists to avoid using 'agpaitic' as a synonym for 'peralkaline' (cf. Azambre and Girod, 1966; Varet, 1969; Mineyeva, 1972) since 'agpaitic' refers to particular peralkaline rocks characterized by a distinctive geochemistry and an exotic mineralogy.

Usage of 'agpaitic' should conform closely to Gerasimovskii's (1956, 1968) and Sørensen's (1960) proposals with three legitimate uses: (a) For an igneous silica-undersaturated peralkaline rock whose chemistry indicates above-normal concentrations of ZrO_2 , Cl, F, Nb_2O_5 , rare-earth oxides, Fe_2O_3 (relative to FeO), and certain other elements, and lower than normal values of CaO, MgO, and CO_2 compared with alkaline or peralkaline rocks of similar SiO_2 content. Such a rock is an 'agpaitic'. (b) To describe a mineral or assemblage of minerals whose composition reflects the 'agpaitic' chemistry of the host rock. Minerals such as eudialyte (F and Cl bearing, Na-rich zirconosilicate), loparite (rare-earth titanosilicate), astrophyllite (Na-rich titanosilicate), villiaumite (NaF) are typical of agpaitic rocks but sodalite cannot be considered as a diagnostic agpaitic mineral since it occurs in both 'agpaitic' and 'non-agpaitic' rocks. (c) 'Agpaitic trend' describes a process by which 'agpaitic' rocks are produced.

'Sub-agpaitic' is appropriate for rocks intermediate between agpaitic and miaskitic types, and not terms such as 'khibinitic'. The term 'agpaitic index' (or coefficient),

denoting a molecular excess of alkalis to alumina, should be discarded since it merely indicates peralkalinity. 'Peralkaline index' is much more appropriate.

Some writers (cf. Goldschmidt, 1930; Polanski, 1949) have used 'agpaitic' to include silica-oversaturated rocks, particularly for granitic pegmatites. Some pegmatites as well as peralkaline granites approach the chemistry of agpaitic undersaturated rocks and contain accessory amounts of 'type' agpaitic minerals such as astrophyllite, elpidite, etc. (Gerasimovskii, 1956). However, many of these rocks also contain the common miaskitic minerals—ilmenite, fluorite, pyrochlore, and calcite as accessories, e.g. the riebeckite granites of Nigeria (Jacobson *et al.*, 1958) and the Ilímaussaq granites (Hamilton, 1964), although generally the latter have Fe_2O_3 less than FeO , a characteristic of the miaskitic rocks (Gerasimovskii, 1956). Such data suggest that oversaturated peralkaline rocks are intermediate between 'agpaitic' and 'miaskitic' rocks and, as such, could be termed 'sub-agpaitic'.

Recently 'agpaitic' has been used for volcanic rocks for which the chemical data presented are either insufficient or simply do not warrant use of the term (cf. Bordet *et al.*, 1955; Varet, 1969) because of the lack of, or low abundance of, ZrO_2 , Cl, and F that indicates a 'non-agpaitic' chemistry. In such rocks Cl and F may be lost on extrusion or by recrystallization (Macdonald, 1969) or may be present in a glassy phase (Edgar, unpublished data).

In conclusion the term 'agpaitic' is useful for a type of peralkaline undersaturated igneous rock with distinctive geochemical and mineralogical characteristics and represents the product of a rare but proven petrogenetic process. It should not be a synonym for 'peralkaline'.

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