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Exsolved sillimanite in granite

MYRMEKITIC intergrowths of plagioclase and quartz are often explained in terms of solid-state exsolution from K-feldspar, e.g. Widenfalk (1969). In a recent account of exsolution textures from a metamorphic aureole setting Sturt (1970) details the clear association with myrmekite of an additional exsolved phase, i.e. sillimanite.This communication outlines an occurrence of sillimanite (fibrolite) with myrmekite and other late textures in an intrusive granite.

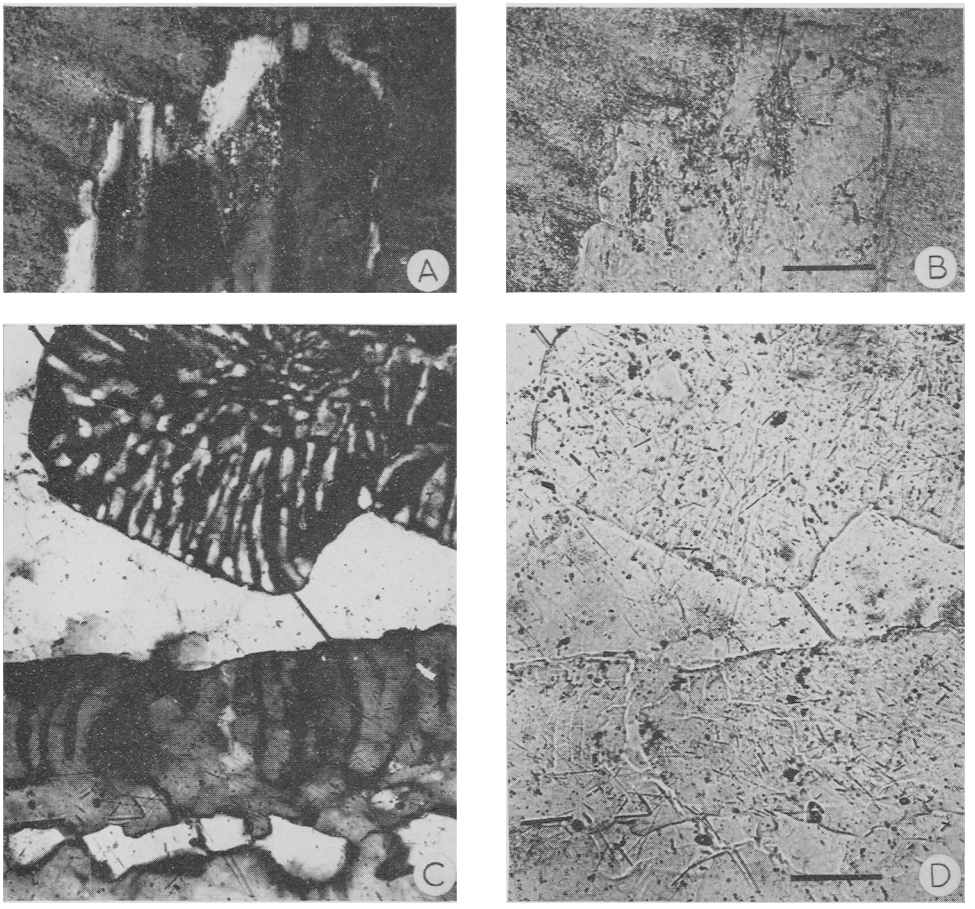

FIG. 1. A and B, Part of a plagioclase inclusion in microcline. C and D, Bulbous-type (upper) and fringe-type (lower) myrmekite invading microcline. See text. Scale mark represents 0·1 mm.

The illustrated textures (fig. 1) are from samples of the Leinster Granite collected in Glenmacnass, Co. Wicklow. The rock (Brindley, 1954, p. 161—Type II granite) ranges from granodiorite to adamellite. It is typically coarse grained with microcline, often as megacrysts, oligoclase, biotite, and late muscovite. Myrmekite commonly forms bulbous growths into K-feldspar and mantling fringes on plagioclase.

In much of the myrmekite sillimanite occurs in varying quantity but often as masses of small (up to 0·2 mm long) slender colourless fibrolite rods (fig. 1, C and D). Though single rods may project into adjacent minerals, the great bulk of them are restricted to the myrmekite. Within that texture they often appear to cross quartz–feldspar junctions. In some instances a weak preferred pattern in their arrangement may be evident (fig. 1 D).

Fibrolite rods, in lesser numbers than in myrmekite, also occur associated with low-calcium rims on plagioclase grains, especially those on small plagioclase inclusions in microcline (fig. 1, A and B). These inclusions are often numerous, compositionally zoned, and are commonly orientated on structural directions within their host. Some of them contain rods throughout. Fibrolite is never present in the main plagioclase of the rock, except very rarely and in small quantity at grain margins and in some small interstitial crystals. Occasionally individual rods, apparently unrelated to either of the above textures, are seen in K-feldspar, particularly when perthitic albite is strongly developed. Only rarely are any rods seen in muscovite even where this mineral is closely associated with myrmekite containing masses of them.

The strongly marked coincidence of sillimanite with the various textures accords with an origin by late exsolution from feldspar. A metasomatic derivation from widely circulating late granitic residues (see e.g. Schermerhorn, 1956, p. 347) seems less likely.

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