

with garnet blastesis. Coronitic garnet growths are classically observed in metagabbros (Lasnier, 1970), and involve reactions between both magmatic plagioclase and ferromagnesian phase. More particularly, kyanite, Mg-hornblende, and garnet have already been described between orthopyroxene and magmatic plagioclase in a meta-orthite from the Rouergue area (Nicollet, 1982). By analogy with this reaction type, we suggest that chromium-free kyanite and Mg-hornblende of the Rd 749 eclogite are the breakdown products of a primary gabbroic stage during the eclogitization event. The nucleation of Cr-kyanite around Cr-rutile could be related to the same process. Pressure-temperature estimates based upon jadeite content in omphacite (minimum pressure; Holland, 1980) and Fe-Mg cationic exchange between garnet and clinopyroxene (thermometer of Ellis and Green, 1979) yield $P = 14.5$ kbar and $T = 760$ °C for the high-pressure stage.

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KEYWORDS: chromian kyanite, eclogite, leptyno-amphibolic group, Rouergue, France.

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Comments on 'Priderite stability in the system $K_2MgTi_7O_{16}$ -BaMgTi₇O₁₆'

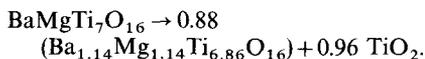
IN a recent contribution to this journal Dubeau and Edgar (1985) investigated solid solution behaviour and stability relations of the hollandite phase along the join $K_2MgTi_7O_{16}$ -BaMgTi₇O₁₆ (KP-BP) in order to obtain a better understanding of the petrogenesis of the naturally occurring titanate hollandite, priderite (K,Ba)_x(Mg,Fe,Ti)₈O₁₆ (Norrish, 1951). They found that rutile coexists with hollandite in all bulk compositions with 50 wt. % or more of BP, and suggested that it was stabilized as a consequence of oxygen deficiencies in the hollandite structure, viz. '(Ba,K)MgTi_{7-x}O_{16-x}'. They also recognized the possibility that

tunnel site vacancies in the hollandite structure might somehow offer an alternative explanation.

These proposals deserve further discussion. Titanate hollandites with Ba as the major or only tunnel cation typically display superlattice periodicity due to ordering of vacant and occupied tunnel sites (Bursill and Grzanic, 1980; Mijlhoff *et al.*, 1985; Kesson and White, 1986). [$K_{2x}Mg_xTi_{8-x}O_{16}$ hollandites may also exhibit superlattice ordering if some of their tunnel sites are vacant and $x < 1.0$ (e.g. Beyeler and Schuler, 1980).]

The stoichiometry of Ba_xMg_xTi_{8-x}O₁₆ hollandites ranges from $x = 1.33$ to 1.14 (Roth, 1981) with

the lower value being adopted by hollandites coexisting with rutile. These non-integral stoichiometries are a necessary consequence of superlattice ordering. Priderite likewise possesses an ordered superstructure and non-integral stoichiometry (Pring and Jefferson, 1983). Dubeau and Edgar (1985) designed their experiments assuming that the most appropriate end-member stoichiometries for magnesian priderites are $K_2MgTi_7O_{16}$ and $BaMgTi_7O_{16}$ respectively. However, the latter is not correct. The appearance of rutile in the run products of BP-rich compositions, and its systematically higher abundance with increasing wt. % BP, demonstrates that the Ba end-member has $x > 1$ and an ordered superstructure. Assuming, for example, $x = 1.14$ then the bulk composition BP_{100} disproportionates to yield rutile as follows:



KEY WORDS: priderite, hollandite, system $K_2MgTi_7O_{16}$ - $BaMgTi_7O_{16}$.

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A note on chalcophanite formation in a Recent lake

RECENT mineralogical interest in the nature of manganese oxide particulates in natural marine water (Suess, 1979), natural lake water (Klaveness, 1977), and simulated lake water (Giovanoli, 1980), prompted a search for such particulates in a large New South Wales coastal lake. While the investigation revealed the presence of sparse amounts of poorly crystalline particulates in near-surface waters, it did show the existence of manganese oxide replacement phenomena in fragmentary sedimentary rocks near the lake margin.

Mineralogical studies showed this oxide to be chalcophanite. Although this mineral is not uncommon in the weathering zone of ore deposits (Frenzel, 1980) it has not previously been recorded in Recent marine or lacustrine deposits (Glasby, 1977). An occurrence of chalcophanite in fossil manganese nodules in fine-grained argillaceous sandstones, of Permian age, in Montana (Gulbrandsen and Reeser, 1969) is, however, interpreted

by these writers as sedimentary. The absence of chalcophanite from Recent marine and freshwater deposits could possibly be considered unusual, as the apparently similar-structured birnessite (Giovanoli and Stahli, 1970) is an often-reported mineral in Recent manganese nodules and crusts (Burns and Burns, 1977).

Occurrence. Lake Macquarie, a large, shallow coastal lake formed by the drowning of coastal lowlands between 20 000 and 6000 BP, is situated to the south of Newcastle, New South Wales. The lake, with a shore line of 180 km and an area of 11 000 ha, is one of the largest salt-water lakes in the world. The salinity is variable, from brackish after heavy rains to very saline after dry periods. Because the lake has limited access to the sea, and because the surrounding area is becoming increasingly populated and industrialized, heavy metal contamination, particularly Pb, Cu, Cd, Se, and Zn is present, particularly in the northern area of the lake