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The occurrence of preiswerkite in a tourmaline-biotite-scapolite rock from Blengsvatn, Norway

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ABSTRACT

We report paragenesis and chemistry of a new occurrence of the rare trioctahedral Al-rich sodium mica preiswerkite. The preiswerkite occurs in a tourmaline-biotite-scapolite rock in the contact zone of a gabbroic boudin surrounded by Proterozoic metasediments near the Blengsvatn, Bamble sector, southern Norway. The preiswerkite occurs as subhedral crystals or is intergrown with biotite in a polygonal fabric together with Cl-rich scapolite + tourmaline ± ilmenite ±plagioclase ±corundum. Accessory minerals are hematite, högbomite, spinel, allanite, apatite, and zircon, with relic calcite. Preiswerkite has the compositional range:

$(Na_{1.84–2.02}K_{0.02–0.10}Ca_{\leq 0.04})(Mg_{3.13–3.42}Fe_{0.63–0.77}{}^{VI}Al_{1.87–2.07})({}^{IV}Al_{3.58–3.96}Si_{4.04–4.29}S_{\leq 0.02})O_{20}[Cl_{\leq 0.03}(OH)_{\geq 3.97}]$

and coexists with Na-Al-rich biotite, with the composition:

$(K_{1.38–1.61}Na_{0.18–0.45}Ca_{\leq 0.03})(Mg_{3.72–3.88}Fe_{1.38–1.43}Ti_{0.10–0.16}{}^{VI}Al_{0.63–0.85})({}^{IV}Al_{2.71–2.93}Si_{5.07–5.29})O_{20}[Cl_{0.02}(OH)_{\geq 3.98}]$.

We suggest that the assemblage preiswerkite + biotite + tourmaline + scapolite ± ilmenite ± plagioclase ± corundum was formed during prograde or peak metamorphism in the area, at ~700 °C and 7 kb.