Note on a sapphirine-bearing symplectite from near Nawalapitiya, Sri Lanka

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Sapphirine occurs in a greenish, streaky gneiss in Highland Series rocks, locally highly deformed, from near Nawalapitiya in the Hatton District. In this rock, sapphirine - K-feldspar and spinel - K-feldspar symplectites are seen to be replacing pyralspite garnet (11.5995A°, R.I. = 1.71-1.83) and sillimanite. (S.G. = 3.23-3.27; R.I. = 1.66-1.6). Spinel (S.G. = 3.58-4.44; R.I. = 1.71-1.83) is dark green, possibly hercynite. Sapphirine, with ideal composition $(MgFe)_2Al_4O_6(SiO_4)$, is pale green, non-isotropic, and slightly pleochroic in shades of green. Birefingence is low and masked, S.G. = 3.4-3.58, R.I. = 1.71-1.73, and the mineral is biaxial, -ve. Sapphirine is in the form of vermicules which are, at times, partly spinel. The symplectites may completely replace garnet. Composition of the rock is:

$SiO_2 = 48.5\%$, $TiO_2 = 0.8\%$, $Al_2O_3 = 30.0\%$, $Fe_2O_3 = 2.9\%$, $FeO = 5.6\%$, $MgO = 2.5\%$, $CaO = 0.3\%$, $MnO = 0.1\%$, $Na_2O = 6.2\%$, $K_2O = 2.4\%$, $P_2O_5 = 0.3\%$, $H_2O^+ = 0.4\%$, $H_2O^- = 0.1\%$, Total = 100.2

The analysis shows that the rock is exceptionally high in Al (30%), which appears as 17.2 normative corundum. The high soda (52% ab) and low magnesia (10% hy) contents are surprising.

The replacement of garnet and sillimanite by sapphirine-bearing symplectites shows that the rock is clearly unstable. Signs of stress in quartz and feldspars suggest this may be due to high stress resulting from tectonisation.