

PETROCHEMICAL STUDY OF THE GNEISS FROM MOUNT
PARDOE AND TONAGH ISLAND IN THE NAPIER
COMPLEX, EAST ANTARCTICA (ABSTRACT)

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The Napier Complex consists of high temperature granulite-facies rocks which are characterized by extremely old ages of about 4000 Ma. Mount Pardoe and Tonagh Island are underlain by pyroxene-quartz-feldspar gneiss. The gneiss can be subdivided into acidic gneiss and basic gneiss. The two types of gneisses are intimately interlayered in many places. Chemical analyses of major elements for the gneisses revealed that the basic gneisses are characterized by high MgO (7-9%) and CaO (9-11%). In contrast, the acidic gneisses are low in MgO (0.4-1.6%) and CaO (1.0-2.5%). Both gneisses show evidence for Rb and K loss. Mineral compositions in the gneisses are also related to the two-gneiss types. Mg/(Mg+Fe) ratios of orthopyroxene of the basic gneisses are high (0.70-0.85), while those of the acidic gneisses have intermediate Mg/(Mg+Fe) ratios (0.35-0.55). Anorthite contents of mesoperthite in the acidic gneisses are high (An₂₀₋₃₀). Mg/(Mg+Fe) ratios of the garnet in the acidic gneisses from Mount Pardoe are slightly low (0.3-0.4) compared with those of the acidic gneisses from Tonagh Island (0.35-0.5). Mg/(Mg+Fe) ratios of ferromagnesian minerals and anorthite contents of plagioclase in the acidic gneiss of Mount Pardoe (mg: 0.3-0.5, An₃₀₋₅₅) are slightly low compared with those of Tonagh Island (mg: 0.45-0.6, An₄₅₋₆₅). The Sm-Nd whole-rock isochron age was determined for the acidic gneisses from Mount Pardoe. These acidic gneisses gave an age of 2516±274 Ma with an initial ¹⁴³Nd/¹⁴⁴Nd ratio of 0.50914 (Y. TAINOSHO *et al.*; Proc. NIPR Symp. Antarct. Geosci., 7, 115, 1994). Similar Sm-Nd whole-rock isochron ages (2458±61 Ma) have obtained from Tonagh Island (M. OWADA *et al.*; Proc. NIPR Symp. Antarct. Geosci., 7, 122, 1994). The ¹⁴³Nd/¹⁴⁴Nd ratio of the acidic gneiss is slightly high compared with that of the basic gneiss on Tonagh Island (0.5097)(M. OWADA *et al.*; Proc. NIPR Symp. Antarct. Geosci., 7, 122, 1994). These differences between the whole rock, mineral chemistry and isotope data may suggest that the acidic gneiss of these two areas derived from different source rocks, that is, these chemical differences in those acidic gneiss imply different tectonic histories of the different lithospheric blocks.

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