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## Provisional results of isotope investigations into quartzo-feldspathic rocks from Kangiussap nunâ, Ivisártoq sheet, southern West Greenland

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The geology of Kangiussap nunâ has been described by Walton (1976), Allaart *et al.*, (1977) and more recently, following 1:20000 mapping, by Coe & Robertson (1982) (see also Brewer *et al.*, this report). A heterogeneous banded gneiss believed to be Amîtoq is intruded by multiphase Nûk gneiss. Coe & Robertson (1982) recognised five phases of Nûk gneiss (Nûk 1–5). These are cut by undeformed to weakly foliated granites and pegmatites which were judged to be of Qôrqt age (Coe & Robertson, 1982).

This report presents the results of Rb-Sr whole rock-analyses and provisional Pb isotope results on representative samples of Nûk 1 to 4 and Qôrqt granite (terminology of Coe & Robertson, 1982). These samples were collected during field mapping in 1981 as part of the Ivisártoq project for the Geological Survey of Greenland at the University of Exeter.

Rb-Sr ratios were determined by X-ray fluorescence spectrometry at the University of Oxford. Sr and Pb isotopes were measured in the same laboratories on VG Micromass 30 and Isomass 54E mass spectrometers, respectively. The generous assistance of P. N. Taylor and S. Moorbath is gratefully acknowledged.

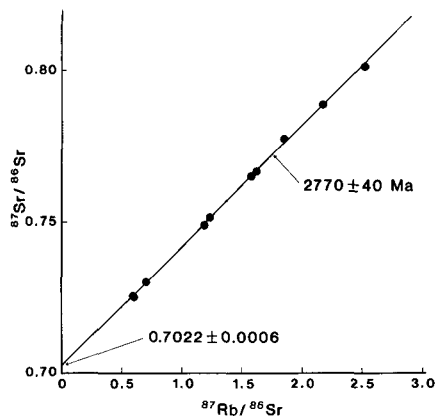


Fig. 15. Rb-Sr whole rock isochron for 10 samples of Nûk gneiss from Kangiussap nunâ.

### Rb-Sr results

Samples representing Nûk 1 and 2 cannot be distinguished isotopically. Ten samples lie on a very well fitted isochron (MSWD = 1.51) with an age of  $2770 \pm 40$  Ma and an initial  $^{87}\text{Sr}/^{86}\text{Sr}$  ratio of  $0.7022 \pm 0.0006$  (fig. 15). This falls within the range of previously reported isochrons on the Nûk gneiss (Moorbath & Pankhurst, 1976; Taylor *et al.*, 1980) both from the type gneisses from the Godthåb district and elsewhere in the Archaean block of southern West Greenland.

Eight samples from rocks mapped on field criteria as Nûk 3 (Coe & Robertson, 1982) produce another very well fitted isochron (MSWD = 1.59) with an age of  $2600 \pm 40$  Ma and an initial  $^{87}\text{Sr}/^{86}\text{Sr}$  ratio of  $0.7038 \pm 0.0006$  (fig. 16). This initial ratio suggests a significant crustal component in the igneous precursors of this group. The date is after the recognised period of Nûk intrusion. A U-Pb zircon age of 2660 Ma was reported from one of several deformed granitic dykes at Qârusuk on south Bjørneøen (Baadsgaard & McGregor, 1981). This one zircon age, however, is insufficient to suggest that these granitic rocks had the same genesis as the intrusive sheets in Kangiussap nunâ.

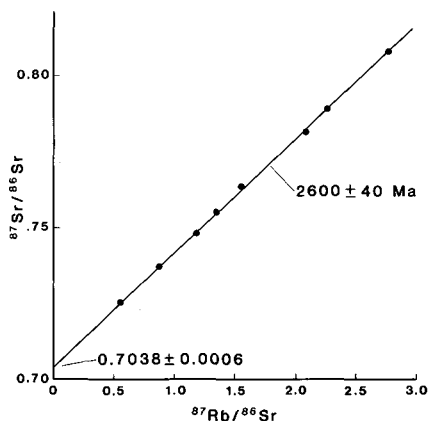


Fig. 16. Rb-Sr whole rock isochron for 8 samples of foliated granite from Kangiussap nunâ.

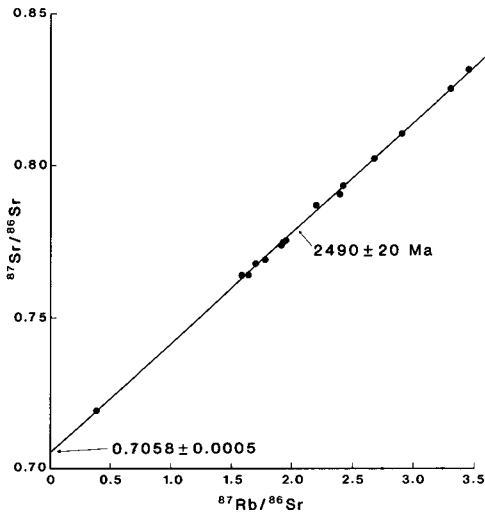


Fig. 17. Rb-Sr whole rock isochron for 15 samples from the Qôrqt Granite Complex in Kangiussap nunâ.

Another fifteen samples form a near perfect isochron (MSWD = 1.33) with an age of  $2490 \pm 20$  Ma and initial  $^{87}\text{Sr}/^{86}\text{Sr}$  ratio of  $0.7058 \pm 0.0005$  (fig. 17). The age is in agreement with previously published Rb-Sr ages on the Qôrqt Granite Complex (Moorbath *et al.*, 1981). However, the initial  $^{87}\text{Sr}/^{86}\text{Sr}$  ratio is somewhat lower than that of  $0.7081 \pm 0.0008$  reported by Moorbath *et al.* (1981), but it is still consistent with crustal partial melting to produce the Qôrqt granite of Kangiussap nunâ.

This last group includes samples that were provisionally assigned to Nûk 4 on field criteria by Coe & Robertson (1982). Therefore Nûk 4 (and consequently Nûk 5) are reinterpreted on the basis of isotope geochemistry as an early phase of Qôrqt granite. It cannot be distinguished isotopically from the later Qôrqt granites.

### Pb isotope results

Pb isotope results on the Nûk gneiss (Nûk 1 and 2) are in fairly close agreement with previously published Pb isotope results from inner Godthåbsfjord (Taylor *et al.*, 1980). The results for the other two groups support the Sr isotope data which demonstrates two periods of crustal partial melting after the intrusion of the Nûk gneiss igneous precursors.

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## Tungsten in the Godthåb area, West Greenland

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The tungsten mineral scheelite has not previously been reported from the Godthåb area in West Greenland. The first indications of its presence were found in heavy mineral concentrates from a stream on Storø in Godthåbsfjord.

Exploration for scheelite in Greenland is difficult. A systematic stream-sediment programme cannot be undertaken before mid-June because many of the streams are frozen or covered with snow until then. Examination in ultra-violet light must be carried out in darkness so scheelite cannot be looked for before the end of August because of the midnight sun and the work must be finished by early September when snow covers the ground. A minor difficulty in this context is the abundance of lichens with bluish white fluorescence which cover the rock surfaces.

The following report is based on field observations only. Laboratory work was limited to X-ray identification of scheelite in two heavy mineral concentrates and in two rock samples.

### *General geology*

In the Godthåbsfjord area, several major rock forming events have taken place, the most important resulting in the formation of the Amîtsoq gneisses, the Nûk gneisses and the Qôrqut granite.

The Amîtsoq gneisses are the oldest, with isotopic ages of about 3700 m.y. (Black *et al.*,