

CNK = 1.3–1.4, a P/Ca of 0.45, has low average Σ REE (11.78 ppm), Zr/Hf (18.84), Nb/Ta (6.10), and Th/U (0.18), has a high Zr/TiO₂ (467.76) and is also enriched in Rb (489 ppm), Sn (28 ppm), Nb (44 ppm), Ta (7.8 ppm), and U (28 ppm). The fractional crystallization of monazite, xenotime, zircon, and apatite produced extreme depletions in HFSEs and the REEs, and a chondrite-normalized REE pattern with a pronounced tetrad effect ($TE_{1,3} = 1.28$). Average zircon and monazite saturation temperatures for the muscovite leucogranite are 650°C and 630°C, respectively.

Past research has yielded a U-Pb monazite age of 417 ± 1 Ma from a sample of biotite granite, which has been interpreted as the emplacement age of the NPSG. Recent CHIME dating of monazite grains in a sample of muscovite leucogranite has yielded a age date of 399 ± 16 Ma; however, quartz-hosted monazite inclusions have yielded an age date of 421 ± 6 Ma, implying they are inherited from either the source material of the NPSG, or an earlier phase in the crystallization history. $^{40}\text{Ar}/^{39}\text{Ar}$ dating of a grain of coarse-grained plutonic muscovite resulted in an age of 406.1 ± 1.9 Ma and is believed to be the age of emplacement for the muscovite leucogranite.

The muscovite leucogranite of the NPSG is abnormally enriched in the radioactive elements U (28 ppm), K (4.26 K₂O wt.%), and to a lesser degree, Th (5 ppm) and therefore it can be considered a high-heat producing granite. Post-crystallization of the NPSG, hydrothermal convection cells driven by radiogenic heat circulated oxidized meteoric fluids along late wrench faults crosscutting the NPSG, which leached uranium from the surrounding granites via the oxidation of uraninite. The dissolved uranium was transported in these circulating meteoric fluids and was deposited as pitchblende and uraninite after being reduced by sulphides formed along these late wrench faults.

The Early to Late Devonian North Pole Stream granitic suite: a strongly peraluminous granitic complex hosting a intragranitic vein-type uranium deposit, New Brunswick

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The Early to Late Devonian North Pole Stream granitic suite (NPSG) underlies an area of about 500 km² in north-central New Brunswick. AFC processes produced four probable comagmatic differentiates namely: biotite granite (n = 6, oldest phase), biotite-muscovite granite (n = 10), muscovite leucogranite (n = 10), and quartz-feldspar porphyry (QFP) granitic dykes (n = 2) that crosscut all other phases of the pluton.

Existing petrochemical data for the NPSG suggest that the young muscovite leucogranite has S-type, syn-collisional characteristics; it is the most highly evolved phase in that it has A/