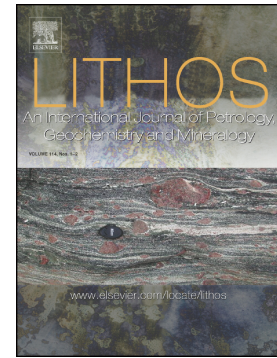


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# Petrography and geochemistry of granitoids from the Samphire Pluton, South Australia: implications for uranium mineralisation in overlying sediments

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## Abstract

The Blackbush uranium deposit (JORC Inferred Resource: 12,580 tonnes U), located on the north-eastern Eyre Peninsula, is currently the only sediment-hosted U deposit investigated in detail in the Gawler Craton. Uranium is hosted within Eocene sandstone of the Kanaka Beds, overlying Mesoproterozoic granites of the Samphire pluton, affiliated with the Hiltaba Intrusive Suite (~1.6 Ga). These are considered the most probable source rocks for uranium mineralisation. By constraining the petrography and mineralogy of the granites, insights into the post-emplacement evolution can be gained, which may provide an exploration indicator for other sediment-hosted uranium systems. Three geochemically distinct granite types were identified in the Samphire Pluton and correspond to domains interpreted from geophysical data. All granites show complex alteration overprints and textures with increasing intensity closer to the deposit, as well as crosscutting veining. Alkali feldspar has been replaced by porous K-feldspar and albite, and plagioclase is overprinted by an assemblage of porous albite + sericite ± calc-silicates (prehnite, pumpellyite and epidote). This style of feldspar alteration is regionally widespread and known from Hiltaba-aged granites associated with iron-oxide copper-gold mineralisation at Olympic Dam and in the Moonta-Wallaroo region. In two granite types biotite is replaced by calcic garnet. Calc-silicates are

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