

BGS critical & strategic minerals research in Zambia

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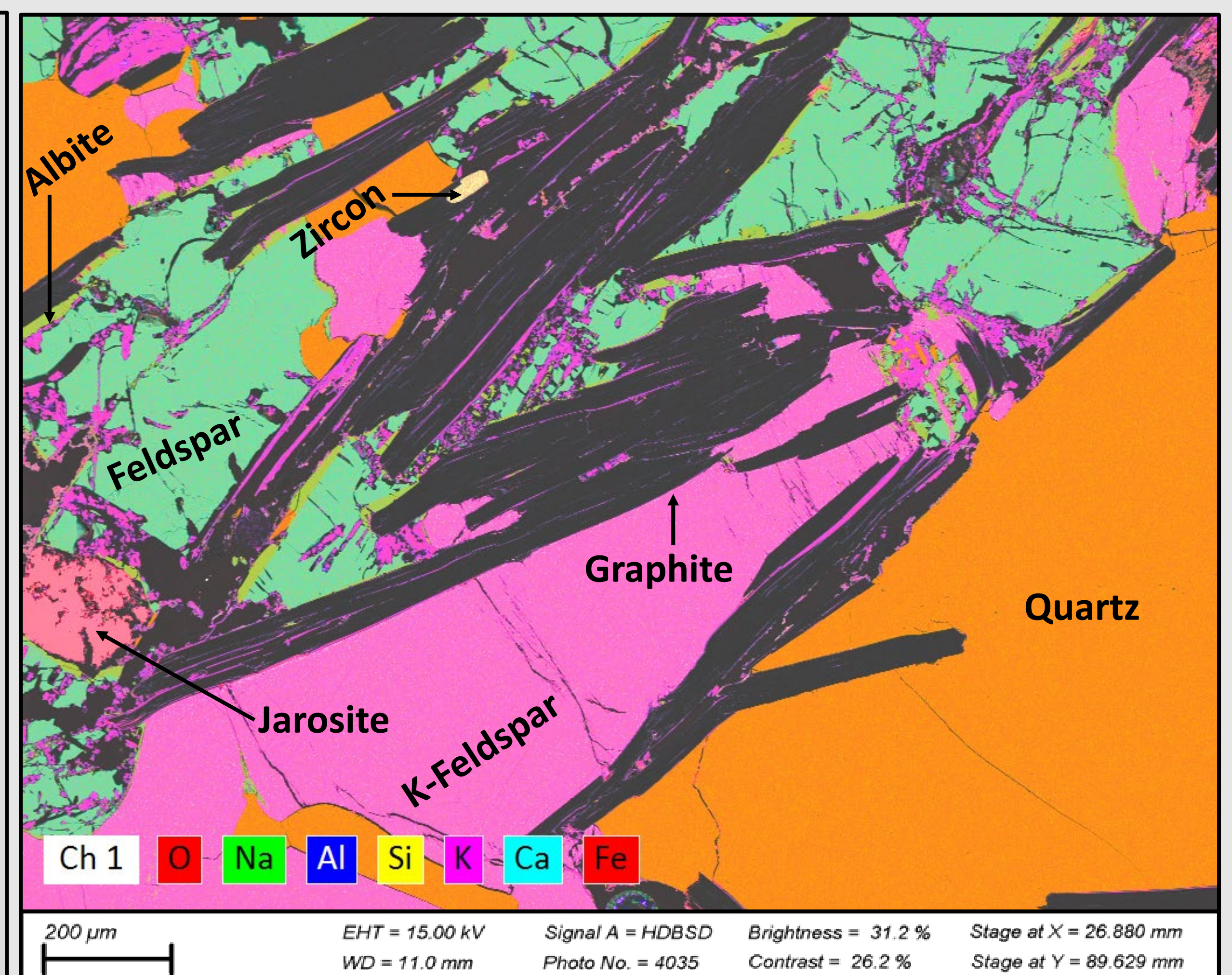
British Geological Survey

Summary: British Geological Survey (BGS) is working with Zambian Geological Survey Department (GSD), Copperbelt University (CBU) & Ministry of Mines and Minerals Development (MMMD) in support of National Critical Minerals Strategy of Zambia with a focus on helping develop the critical mineral capacity of GSD. This is jointly funded by BGS International Geoscience Research & Development (IGRD) programme and the UK Foreign, Commonwealth & Development Office (FCDO) Green Inclusive Growth Centre of Expertise.

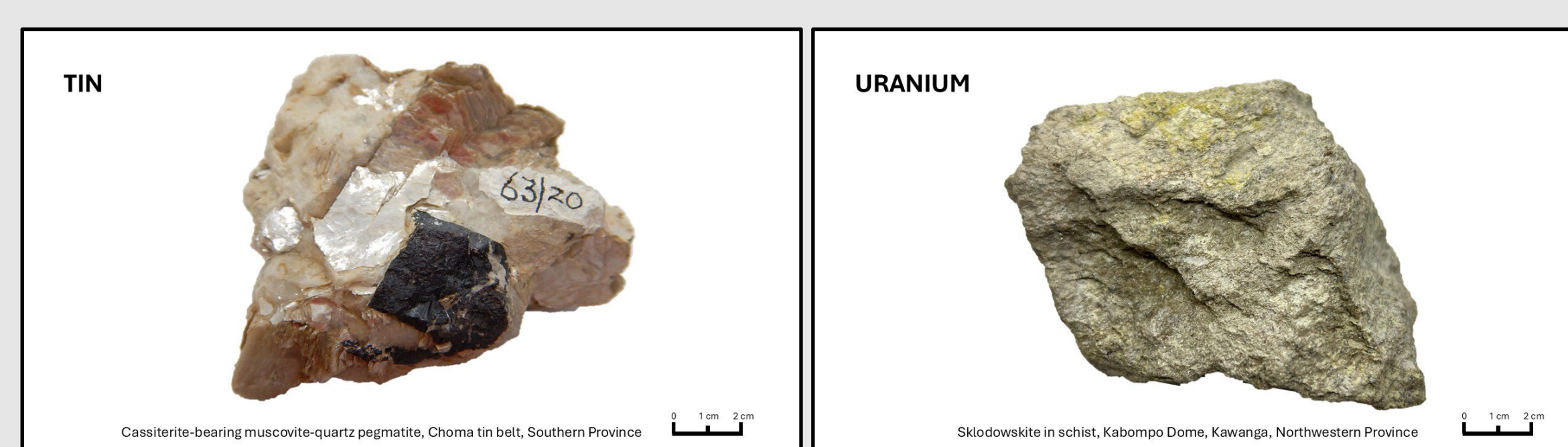
Objectives: Critical & strategic mineral resource identification and guidance for Zambia; Develop a flake graphite reconnaissance exploration methodology for Zambian GSD (that would also be applicable to other National Geological Surveys in Africa and beyond).

IGRD project activities / outputs:

- Report on Zambian graphite field reconnaissance, carried out in Petauke, Eastern Province, Zambia in June 2023 with GSD & CBU (published May 2024): <https://nora.nerc.ac.uk/id/eprint/537482/>
- Petrographic & mineralogical characterisation of graphite-rich samples from Mesoproterozoic paragneiss in Petauke, Zambia. Graphite content ranges from 0.3 to 27% Total Graphitic Carbon and from 'Large' to 'Super Jumbo' grade graphite flake sizes. See photomicrograph ⇨
- Presentation at Critical Minerals conference in Cape Town, South Africa (14-15th November 2024) + draft paper for Minerals Engineering journal.
- Draft "Critical minerals potential of Zambia" guide that covers cobalt, coltan, copper, graphite, lithium, manganese, nickel, Rare Earth Elements (REEs), sugilite, tin & uranium in Zambia (see examples used in guide below). Work to be presented at Zambian International Mining & Energy Conference (ZIMEC) 2025 in Kitwe, Zambia in March 2025.



False colour Scanning Electron Microscope (SEM) photomicrograph of graphite-rich paragneiss from Petauke, Zambia. Graphite occurs as crystalline flakes with quartz, jarosite, feldspar and zircon. It is typically hosted in biotite (often aligned with cleavage) and jarosite. In weathered samples, graphite is often expanded along cleavage planes with embedded mineral impurities. Image location in yellow box below.



Mineral specimens from the geological museum of the Zambian Geological Survey Department (GSD) in Lusaka.

Pathway to Impact progress:

- Zambian Government National Critical Minerals Strategy informed by BGS/ GSD research activities (Outcome 1: Policy).
- Potential for regional/ global application of critical mineral research by National Geological Surveys (Outcome 2: Global reach).
- Outputs have enabled GSD to carry out graphite reconnaissance & gain better understanding of critical and strategic minerals in partnership with BGS & CBU (Outcome 3: Embedded practice).
- Longer term impact to increase exploration activity for, and production of, critical minerals in Zambia, particularly flake graphite.

Commercial flake graphite grades

Super Jumbo	>500µm	Medium	150 to 180µm
Jumbo	300 to 500µm	Fine	75 to 150µm
Large	180 to 300µm	Amorphous	<75µm