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Geochemical and mineralogical studies of uranium potential of the late Devonian to early Carboniferous Takoradi Black Shale, Sekondian Group, Ghana

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Geochemical and mineralogical studies were carried out on the Late Devonian to early Carboniferous Takoradi Shale Formation (TSF) of Sekondian Group, Ghana to investigate its potential to host uranium, thorium and other trace elements. The TSF is typically composed of hard, compact, black/dark grey fissile shale/sandy shale, rich in organic matter, and its upper part is characterised by inclusions of large discoidal siderite nodules. Mineralogical studies of the shales were performed by powder X-ray diffraction. The main mineral phases identified include quartz, vermiculite, zeolite and other clay minerals as well as uranium oxide and uranyl-oxide minerals. Whole-rock geochemical analysis of 19 representative black shale samples by ICP-MS has revealed Th and U concentrations of 18.05–22.06 ppm and 6.89–8.99 ppm, respectively. Thorium, Zr, Nb, Ta, V, La, total REEs and Ti which are typically enriched in uraniferous black shales are also enriched in the Takoradi Shales relative to Post-Archean Average Australian Shale. Uranium shows strong positive correlation with compatible trace elements such as Cr, V, Zr and Ni. Further studies will be conducted to confirm these elemental associations and the low uranium potential of the Takoradi Shale Formation.

Country or International Organization

Ghana

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