

SIGNIFICANCE OF LITHO-GEOCHEMISTRY IN SEARCH OF UNCONFORMITY TYPE URANIUM MINERALISATION IN PARTS OF SHILLONG BASIN COVERING SOHIONG- SUMER- SONIDAN AREA, EAST KHASI HILLS & RIBHOI DISTRICTS, MEGHALAYA, INDIA

A. K. Patel¹, M. Nagendra Kumar², R. Timothy³, Pradeep Pandey⁴, Syed Zakauulla² and P. S. Parihar¹

Atomic Minerals Directorate for Exploration and Research,

¹Hyderabad, ²Bangalore., ³Shillong and ⁴New Delhi

E-mail: ashokpatel74@gmail.com

Abstract

Unconformity type of uranium deposits are concealed in nature and their limited surface expression of radioactivity; close association of broad alteration haloes in the cover rock as well as geochemistry play a major role in locating such deposits.

In the area of this study favorable geological factors such as, the reducing environmental condition with high intrinsic uranium content represented by the Lower Proterozoic Tyrsad Formation; presence of oxidized cover rock as evidenced by the Mesoproterozoic Barapani Formation; thermal gradient generated by younger igneous activity and the presence of the cross cutting Tyrsad-Barapani shear zone are very encouraging indications for carrying out exploration for locating unconformity type of uranium mineralisation. Based on the said favorable geological setup, geochemical exploration has been carried out by systematic sampling of Barapani sediments and Tyrsad meta-sediments over an area of 400 sq km covering Sohiong- Sumer- Sonidan area, Ribhoi and East Khasi Hills District, Meghalaya.

Radiometric analysis of the Tyrsad metapelites and the arenites of Barapani Formations shows an uranium content upto 11ppm and 20ppm respectively. A higher concentration of uranium (upto 100ppm) has been recorded very close to the unconformity contact between Tyrsad and Barapani Formation.

The clay alteration plot of MgO/Al₂O₃ vs K₂O/ Al₂O₃ indicates illitisation. Normalization of the present data with the altered sandstone of Key Lake deposit in Athabasca Basin, Canada reveals enrichment of K₂O, Al₂O₃, TiO₂, MgO, Na₂O, CaO and depletion of SiO₂, which indicates alteration exemplified by illitisation, chloritisation and desilicification.

Presence of illitisation; the observed anomalous uranium concentration in Tyrsad and Barapani Formations; cross cutting faults in Tyrsad-Barapani Shear zone in Umden-Umroi-Raitong and Ksehkinjohn areas indicate the presence of a possible target for locating an unconformity type uranium mineralization in the Proterozoic Shillong Basin of Meghalaya.

Keywords: Litho geochemistry, Unconformity type of uranium deposit, Shillong Basin, Meghalaya.