

Tourmaline Chemistry of Metasomatized Rocks the Jahaz U-deposit, Khetri Belt, North Delhi Fold Belt, NW India

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The Jahaz deposit is one of the promising U-occurrences along the “albitite line” of the North Delhi Fold Belt, Rajasthan, India (Ray, 1987). Host rocks comprise quartz biotite schist, amphibolite, and quartzite. Uraninite, sulfides, and oxide mineralization in the Jahaz area is Na-metasomatic-type, medium-tonnage and low-grade. It occurs as veins and dissemination in the albitized rocks and deformed zones. The host rocks were less to moderately/intensely altered (albitized), and the U-mineralization is linked with albitized rocks. These two major episodes of metasomatic alterations correspond to distinct types of tourmalines: (i) tourmaline-1 (T1) is olive green and found in less to moderately altered rocks, and (ii) tourmaline-2 (T2) is light green to brown and occurs in albitized rocks. The structural formulae of tourmaline are calculated based on 15 cations. The electron probe analyses of T1 exhibit a range in the (Na/(Na+Ca)) ratios from 0.90 to 1.25 apfu, $X_{Mg} = Mg / (Fe + Mg)$ varies from 0.53-0.82 apfu, and X-site vacancy ($1 - (Na + K + Ca)$) varies from 0.08 to 0.32 apfu. Although T2 shows the (Na/(Na+Ca)) range from 0.84 to 0.91 apfu, $X_{Mg} = Mg / (Fe + Mg)$ spans from 0.81-0.87 apfu, and X-site vacancy ($1 - (Na + K + Ca)$) varies from 0.08 to 0.15 apfu. The mineral chemistry of both tourmalines indicated that they fall into the alkali group and are composed of dravite. T2 has higher Na, Ca, and Mg concentrations than T1, indicating enrichment of these elements during fluid-rock interactions. Thus, hydrothermal fluids forming uranium mineralization in the intensely altered Jahaz deposit were enriched in Na, Ca, and Mg. The outcome of the present work can be useful to exploration agencies in targeting Na-metasomatic U-deposits more precisely in other areas.