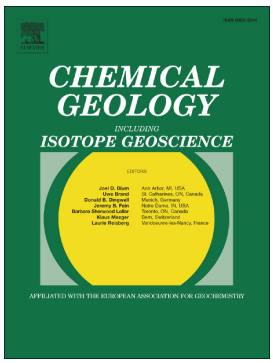

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A new occurrence of titanian (hydro)andradite from the Nagaland ophiolite, India: implications for element mobility in hydrothermal environments

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Titanium-bearing (hydro)andradites from hydrothermally altered mantle section of the Nagaland ophiolite, India have been investigated for mineral chemical study. In serpentinized peridotite they occur in association with accessory chromites or dusty magnetites and the TiO_2 content in them is relatively low (<0.35 wt.%). (Hydro)andradites in magnetite pods, hosted within serpentinized peridotite have a range of TiO_2 content (up to 13.77 wt.%) and occur typically within veins and veinlets intricately traversing the pods. The TiO_2-rich variants of the (hydro)andradites within the veins occur either as large, polyhedral, margin-parallel zoned, mostly isolated grains within an andradite-rich porous matrix, or in clusters of equant, complexly zoned spherulites, resembling a fissure-fill. Besides (hydro)andradites as the most abundant component, the remaining of the veins consists mostly of serpentine and chlorite with relict titanites and perovskites. Magnetite pods are almost monomineralic, composed of large chromian magnetite crystals with accessory ilmenites occurring at the grain boundaries. Textural and mineralogical evidences suggest the transformation of these pods prior to the formation of (hydro)andradites from chromitite protoliths that have undergone extensive Ca-metasomatism together with host peridotites. We envisage at least two hydrothermal episodes for the mineralogical modifications where the formation of (hydro)andradites is related to the last event. The textural and mineral chemical characteristics of the entire assemblage as a whole demonstrate a gradual, temporal evolution in the composition of the metasomatic fluid from the onset of serpentinization to the end. This new occurrence of titanian andradites from chromitite protolith, hitherto not reported has major implications on the mobility of elements in hydrothermal environments.

Highlights

- Titanian andradites, hosted in magnetite pods from serpentinized mantle peridotite demonstrate a new type of occurrence