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Trace and rare earth elements geochemistry in tungsten-bearing quartz-tourmaline veins and tourmaline mineral separates from Nezamabad area, western Iran: implication for tungsten genesis

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The Nezamabad area of Boroujerd Granitoid Complex is a significant tungsten-bearing area in western Iran. This deposit is unusual because tungsten mineralization as scheelite occurs exclusively within the granitic bodies. The genesis of the ore deposit has been debated so far and some models proposed for the mineralization have completely associated this mineralization with the host quartz diorite body. We present trace and rare-earth element (REE) data in tungsten-bearing quartz-tourmaline veins and tourmaline mineral separates from the orebody to clarify its genesis. Tungsten-bearing quartz-tourmaline veins and tourmalines show similar patterns in LILEs including Cs, Ba, Rb, Sr, Pb and HSFEs including Th, U, Zr, Ti, Mo, W, Sn, Sb as their quartz diorite host rock. They also reveal strong LREE-enriched and slight HREE-depleted pattern similar to their host rock with variable Eu and Ce anomalies. Having the same patterns in LILEs and HSFEs, tourmalines have lower Rb, Cs and Co and higher Sr contents than the quartz diorite host rock. On the basis of the approximate geochemical similarity observed in the veins, tourmalines and host rock, it seems that tungsten mineralization could be roughly associated with the granitic body. However, their LREE-enriched pattern, variable Eu and Ce anomalies plus lower Rb, Cs and Co and higher Sr contents in tourmalines demonstrate that they might be derived from metamorphic fluids. We propose a bimodal metamorphic-magmatic origin for the tungsten mineralization with a predominance of metamorphic fluids released by

dehydration reactions during contact metamorphism of host granitic bodies.