ABSTRACT

Uranium aluminide (UAI₃) is a mixture of three distinct intermetallic compounds comprised of UAl₂, UAl₃ and UAl₄, where the “x” is used to name a mixture of those phases. Usually UAlₓ is formed either during the synthesis or along the target fabrication process by means of a solid-state reaction between the uranium dialuminide (UAl₂) and aluminum. Quantitative techniques such as image analysis, EBSD, X-ray diffraction using the Rietveld refinement were compared for their applicability in the determination of the UAl₂, UAl₃ and uranium oxide concentrations in the UAl₂ ingot. The EBSD technique was not able to distinguish the uranium aluminide phases in this preliminary study. However, the image analysis and x-ray diffraction method were shown to be useful for UAIₓ phase quantification in the primary UAl₂ ingot.

Keywords: Uranium aluminide, Targets, Image analysis, Rietveld refinement.