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**Phase Quantification in Uranium Aluminide Ingot**

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**ABSTRACT**

Uranium aluminide ( $UAl_x$ ) is a mixture of three distinct intermetallic compounds comprised of  $UAl_2$ ,  $UAl_3$  and  $UAl_4$ , where the “x” is used to name a mixture of those phases. Usually  $UAl_x$  is formed either during the synthesis or along the target fabrication process by means of a solid-state reaction between the uranium dialuminide ( $UAl_2$ ) 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  $UAl_2$ ,  $UAl_3$  and uranium oxide concentrations in the  $UAl_2$  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  $UAl_x$  phase quantification in the primary  $UAl_2$  ingot.

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