

Evaluation of As-Cast U-Mo Alloys Processed in Graphite Crucible Coated with Boron Nitride

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Abstract : This paper reports the production of uranium-molybdenum alloys, which have been considered promising fuel for test and research nuclear reactors. U-Mo alloys were produced in three molybdenum contents: 5 wt.%, 7 wt.%, and 10 wt.%, using an electric vacuum induction furnace. A boron nitride-coated graphite crucible was employed in the production of the alloys and, after melting, the material was immediately poured into a boron nitride-coated graphite mold. The incorporation of carbon was observed, but it happened in a lower intensity than in the case of the non-coated crucible/mold. It is observed that the carbon incorporation increased and alloys density decreased with Mo addition. It was also noticed that the increase in the carbon or molybdenum content did not seem to change the as-cast structure in terms of granulation. The three alloys presented body-centered cubic crystal structure (g phase), after solidification, besides a seeming negative microsegregation of molybdenum, from the center to the periphery of the grains. There were signs of macrosegregation, from the base to the top of the ingots.

Keywords : uranium-molybdenum alloys, incorporation of carbon, solidification, macrosegregation and microsegregation

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