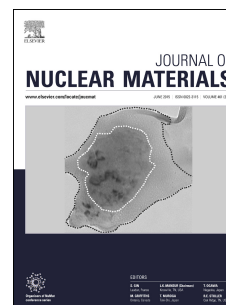


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Experimental investigation of the phase equilibria and thermodynamic assessment in the U-Ga and U-Al-Ga systems

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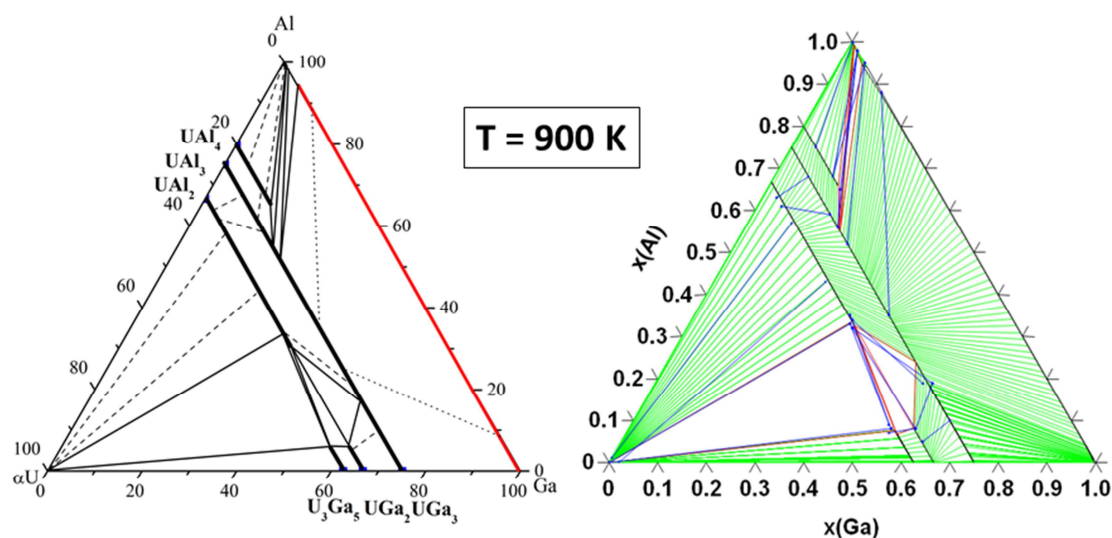
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GRAPHICAL ABSTRACT :

In present work, the phase equilibrium relations in the U-Al-Ga ternary system were investigated using key equilibrated alloys. Based on the experimental results from electron-probe microscopy analysis, x-ray diffraction techniques and DTA measurements, two isothermal sections were constructed at 900 K and 1150 K. The phase diagram, which is characterized by the absence of ternary intermetallic phases, engages phase relations involving ternary extensions of the binary compounds with substitution mechanism between the *p*-elements only, and minute solubilities in metallic uranium. Thermodynamic assessment for the U-Al-Ga ternary system has been developed by means of the CALPHAD approach yielding a set of reliable thermodynamic parameters. Prior to the ternary investigation, uncertainties in the U-Ga binary system, motivated a reassessment of this binary phase diagram by combining an experimental approach on key compositions and a thermodynamic modelling.



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