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The Fabrication and Characterisation of Novel Complex Ceramic Oxides (Ln2TiO5) For Polyphase Ceramic Waste-Forms.

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The structure types within the Ln2TiO5 (Ln = lanthanides) system have similarities with many of the proposed phases within the titanate ceramic waste-form Synroc. Certain compounds might also be suitable for inert matrix fuel applications. Previous studies have shown a relationship between lanthanide radii and polymorph type for the Ln2TiO5 system. By using multiple lanthanides the average lanthanide radius can be controlled and so the structure. In this study four different combinations of lanthanide titanates were fabricated with the aim of producing single phase, novel design materials with cubic symmetry. Whilst it is possible to fabricate homogeneous materials with the general Ln2TiO5 stoichiometry using multiple lanthanides there appears to be limited solubility. The ratio of the lanthanides influences the final structure type and also the solubility. The structure type influences the heavy ion irradiation response of these compounds and we report on TEM in-situ experimental results related to this.

Summary

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