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**Structural investigations of americium and curium
in zirconium-oxide based materials**

P.E. Raison¹, R.G. Haire²

¹ Commissariat à l'Énergie Atomique
CEA-Cadarache DEN/DEC/SPUA/LMPC 13108 – France

² Oak Ridge National Laboratory
P.O. Box 2008, Oak Ridge, TN 37831-6375 – USA

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Pseudo-ternary oxide systems of americium, curium and zirconium have been examined as potential materials for the transmutation of these actinides. In our experimental efforts, we investigated the phase behaviors of (Am,Zr,Y), (Cm,Zr) and (Am,Cm,Zr) oxide materials using X-ray diffraction as one of the tools. Both solid solutions and diphasic materials were encountered in these systems depending of the concentrations and the oxidation states exhibited by the actinides. For example, we determined that Cm (III) can stabilize the cubic form of zirconia at certain compositions. We have also investigated selected compositions in the ternary system, AmO₂-Cm₂O₃-ZrO₂ system for the concept that both actinides could be transmuted simultaneously to avoid the need for their partitioning during fuel reprocessing. The presentation will discuss our recent efforts with these different zirconium-oxide-based systems and the implications for using these tailored materials for actinide transmutation. Finally, we will compare the structural behavior of these materials with those of selected lanthanide-zirconium oxide systems.

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