Contribution ID: **119** Type: **Poster**

Formation of ruthenium alloys with curium and technetium

Monday, 19 April 2010 11:45 (20 minutes)

Presented are the results of production and x-ray examination of ruthenium compounds with curium and technetium.
A curium -244 alloy microsample was produced by the high-temperature condensation of curium vapor onto the ruthenium substrate and then analyzed by the x-ray diffractometric method. Two intermetallides were detected in the sample: Ru2Cm with a hexagonal lattice of the Zn2Mg type with parameters a = 5.279(1) Å, c = 8.812(3) Å; Ru3Cm with a cubic lattice of the Cu3Au type and a = 4.151(2) Å. Data were obtained on the x-ray amorphization of lattices of both intermetallides under intensive alpha-decay of curium-244.
The study on the formation of ruthenium alloys with technetium is carried out as part of investigations of technetium transmutation. This process can be implemented in the high-flux reactor SM-3 (Dimitrovgrad, Russia) at an acceptable rate. For the subsequent separation of ruthenium from irradiated samples data are required on the phase relationship in the technetium-ruthenium system under irradiation conditions. This paper describes the x-ray diffractometric examination of samples of starting metal technetium and also those irradiated in the reactor up to a 19, 45 and 70% ruthenium accumulation. The study demonstrates that as a result of the ruthenium accumulation homogeneous solid ruthenium-technetium solutions with a hexagonal close-packed (HCP) structure are formed. Crystal lattice parameters a and c regularly decrease with increasing ruthenium concentration. The existence of a sufficiently strong dependence between the crystal lattice parameters and amount of ruthenium accumulated under irradiation allows the definition of ruthenium content in the irradiated technetium by using the x-ray diffractometric method.

Primary author: Prof. RADCHENKO, Viacheslav (JSC ”State Scientific Center - Research Institute of Atomic Reactors”)

Presenter: Prof. RADCHENKO, Viacheslav (JSC ”State Scientific Center - Research Institute of Atomic Reactors”)

Session Classification: Poster Session - Chemistry of Actinide and Trans-actinide Elements

Track Classification: Chemistry of Actinide and Trans-actinide Elements