fluence of about 10^{23} cm^{-2} [3]. Thus, the problem of Tc-99 transmutation to stable Ru requires conditions which are like ones of effective transmutation of minor actinides (and other long-lived radionuclides such as I-129, Cs-135) by above-mentioned method and can be solved with help of the same device.

The most perspective targets for transmutation are Tc metal, its intermetallides and carbide TcC having high stability with great temperatures in absence of oxygen. The homogeneity of the burn-up depends on Tc-99 nuclear density in the target and its thickness. It is clearly that the relative change δ of neutron fluence rate corresponds the layer of Tc-99 and its transmutation products with thickness:

$$l = -\ln(1 - \delta) / \Sigma_{(i)} N_i(\sigma_i + \gamma I_i),$$

where N_i - nuclear densities of nuclides, σ_i - their capture cross sections of thermal neutrons, I_i - their resonance integrals of neutrons capture.

We have calculated approximately such dependence for completely metalic Tc-99 target. For example, if the target of 5 mm thickness has nuclides composition corresponding to thermal fluence of $5*10^{22}$ cm^{-2} (γ=0.3), as the result of Tc-99 metal irradiation, then neutron fluence rate decreases only 1.5 times and relative change of Ru yield in the target will be less than about 1% (fig.2). However, really thermal neutron fluence must be somewhat more than mentioned value for achievement of high Ru yield homogeneity in such target because of different transmutation rates within various target regions at the beginning of irradiation. Thus, approximate recommended dimensions of each target forms multiplied on nuclear density of Tc-99 in it must be less than the same value for Tc-99 metal target of 5 mm thickness.

Nuclear Ru produced by Tc-99 transmutation will be free of impurities of Cu, Ni, Pt, Ir, Os which are typical for natural Ru and will contain less Rh and Pd than natural Ru does.

Thus, Tc-99 transmutation can be the liquidation method of this hazardous waste and simultaneously the production way of valuable stable Ru suitable for industry application and more pure than natural Ru.

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