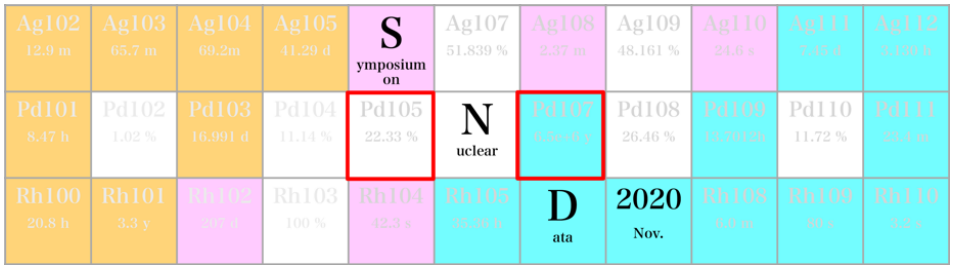

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Comparison of photon spectra emitted from fuel debris using different decay data libraries / 異なる崩壊データライブラリを用いた燃料デブリから放出される光子スペクトルの比較

Thursday, 26 November 2020 16:59 (1h 51m)

We require reliable nuclear data that can appropriately evaluate the radiation characteristics of fuel debris for the purpose such as development of new sensors, non-destructive assay technologies and optimization of radiation shielding. In the past, even if different results were obtained depending on calculation codes, it was difficult to clarify what caused the differences. To overcome it, we have developed a new reliable code to calculate radiation decay and radioactive source spectra that can accurately treats with large amounts of nuclides and all decay modes in the decay data file.
As the first step, we compared the photon spectra of fuel debris by using the recent decay data files: JENDL/DDF-2015, decay sub-libraries of ENDF/B-VIII.0 and JEFF-3.3. As shown in Fig.1, the result of JENDL/DDF-2015 is smaller than those of ENDF/B-VIII.0 and JEFF-3.3. This is mainly caused by the following reasons:
(1) X-ray data of 137mBa (T1/2 =2.6 min.) in JENDL/DDF-2015 is missing. The 137mBa is generated from β-decay from large amount of 137Cs (T1/2 = 30 years) and it will remain for a long time by radiation equilibrium.
(2) Gamma ray data of 241Am in 60 keV is missing in JENDL/DDF-2015.
(3) Gamma ray data of 106Rh (T1/2 = 2 hour) is missing in JENDL/DDF-2015 in the energy range from 3.0 to 3.4 MeV. The 106Rh is in the radiation equilibrium with 106Ru (T1/2=1.0 year)
In the presentation, we will report requests for the modifications on the decay schemes and branching ratios of decay modes for the next JENDL decay data file.

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