

Symposium on Nuclear Data 2020

Ag102 12.9 m	Ag103 65.7 m	Ag104 69.2m	Ag105 41.29 d	S ymposium on	Ag107 51.839 %	Ag108 2.37 m	Ag109 48.161 %	Ag110 24.6 s	Ag111 7.45 d	Ag112 2.135 h
Pd101 8.47 h	Pd102 1.02 %	Pd103 16.991 d	Pd104 11.14 %	Pd105 22.33 %	N uclear	Pd107 6.5e+4 y	Pd108 26.46 %	Pd109 15.7002h	Pd110 11.72 %	Pd111 23.4 m
Rh100 20.8 h	Rh101 3.3 y	Rh102 2.72 y	Rh103 100 %	Rh104 42.3 s	Rh105 35.35 h	D ata	2020 Nov.	Rh108 9.0 m	Rh109 99 s	Rh110 3.3 s

Contribution ID: 51

Type: **Poster Presentation**

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 ^{137m}Ba ($T_{1/2} = 2.6$ min.) in JENDL/DDF-2015 is missing. The ^{137m}Ba is generated from β -decay from large amount of ^{137}Cs ($T_{1/2} = 30$ years) and it will remain for a long time by radiation equilibrium.
- (2) Gamma ray data of ^{241}Am in 60 keV is missing in JENDL/DDF-2015.
- (3) Gamma ray data of ^{106}Rh ($T_{1/2} = 2$ hour) is missing in JENDL/DDF-2015 in the energy range from 3.0 to 3.4 MeV. The ^{106}Rh is in the radiation equilibrium with ^{106}Ru ($T_{1/2}=1.0$ 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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Session Classification: Poster