

Decay heat calculations with JENDL-5*

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Decay heat calculations are carried out with the reactor physics code system CBZ using the one-point nuclide transmutation calculation module `Cooler` against the experimental data after the burst fission and the finite-period irradiation. The latter data are known as the Tobias data. On the fission by fast neutrons, the fission yield data at the incident energy of 500 keV are used.

In the JENDL-5 paper, results of the decay heat comparison are presented in Figs. 79 and 80[1]. Numerical results obtained with JENDL-5 can be found also in the presentation by Giot at the APRENDE workshop ¹.

1 Burst fission

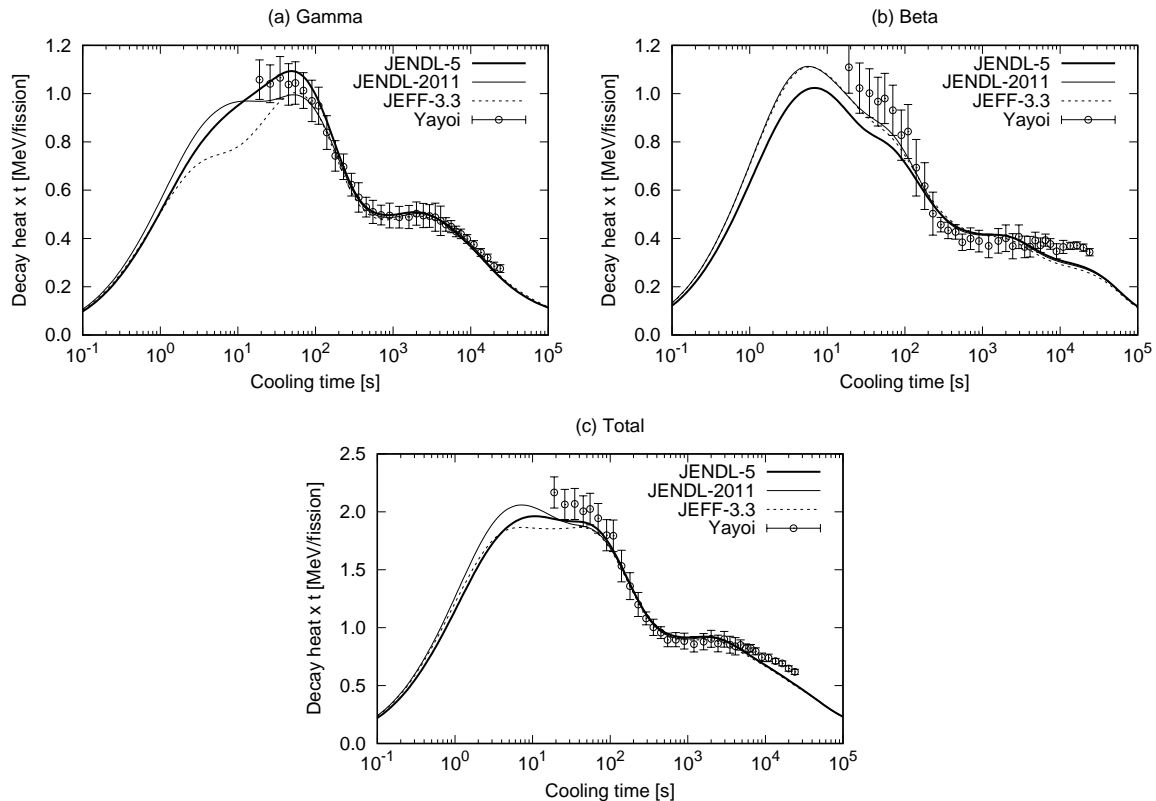


Figure 1: Decay heat after fission burst of Th-232 by fast neutron

* /CBGCAL/DecayHeatCal/PLOT

¹https://indico.psi.ch/event/16894/contributions/54245/attachments/29829/57995/Aprende_Talk_GIOT_240225_VF.pdf

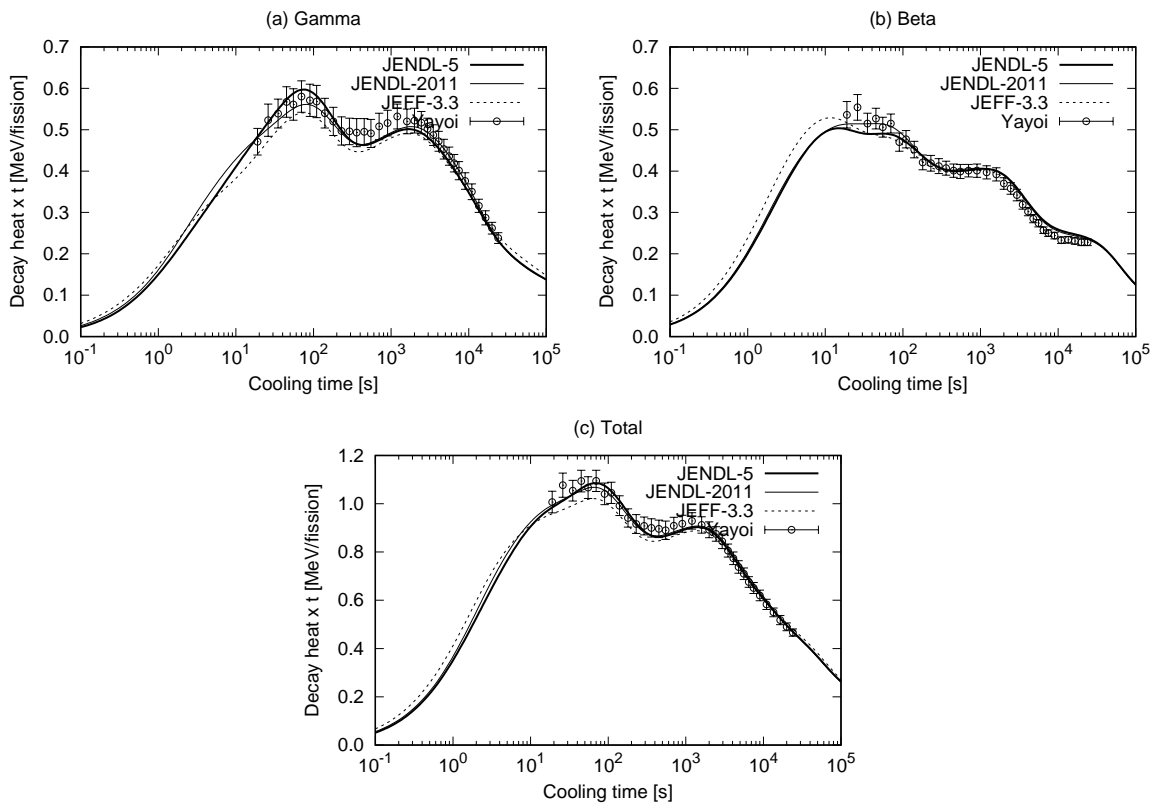


Figure 2: Decay heat after fission burst of U-233 by fast neutron

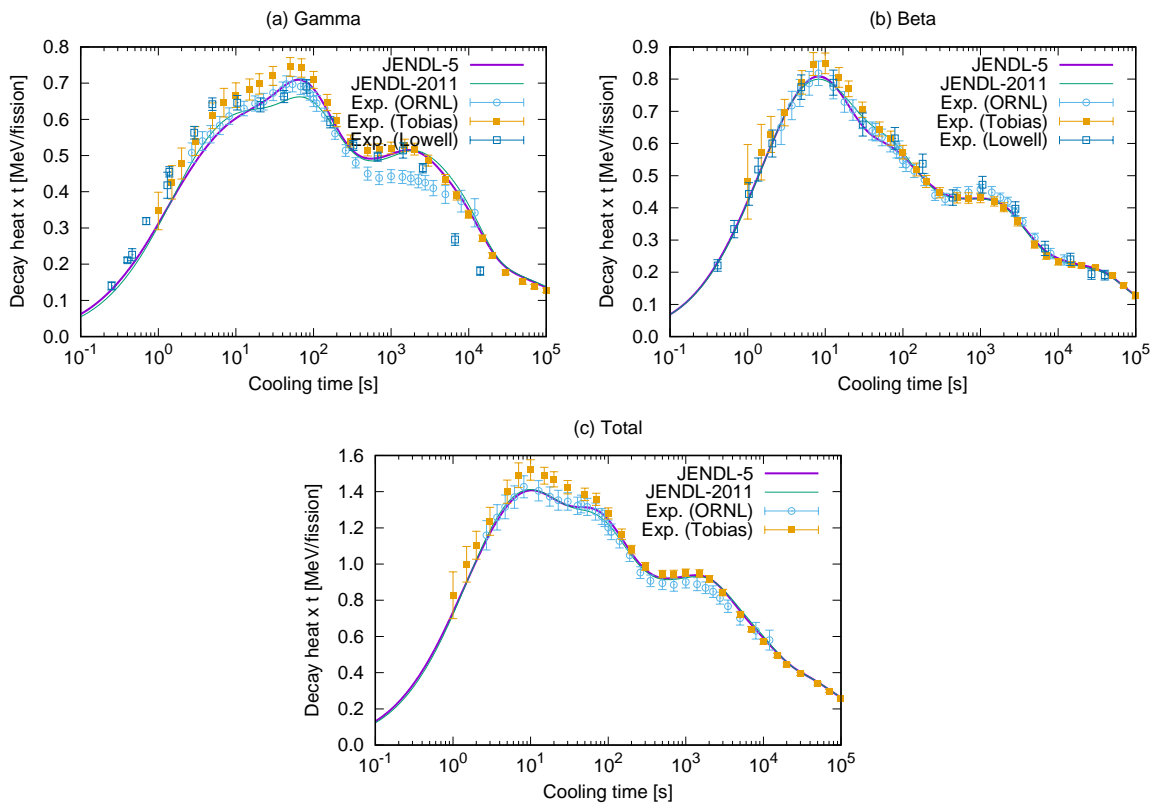


Figure 3: Decay heat after fission burst of U-235 by thermal neutron

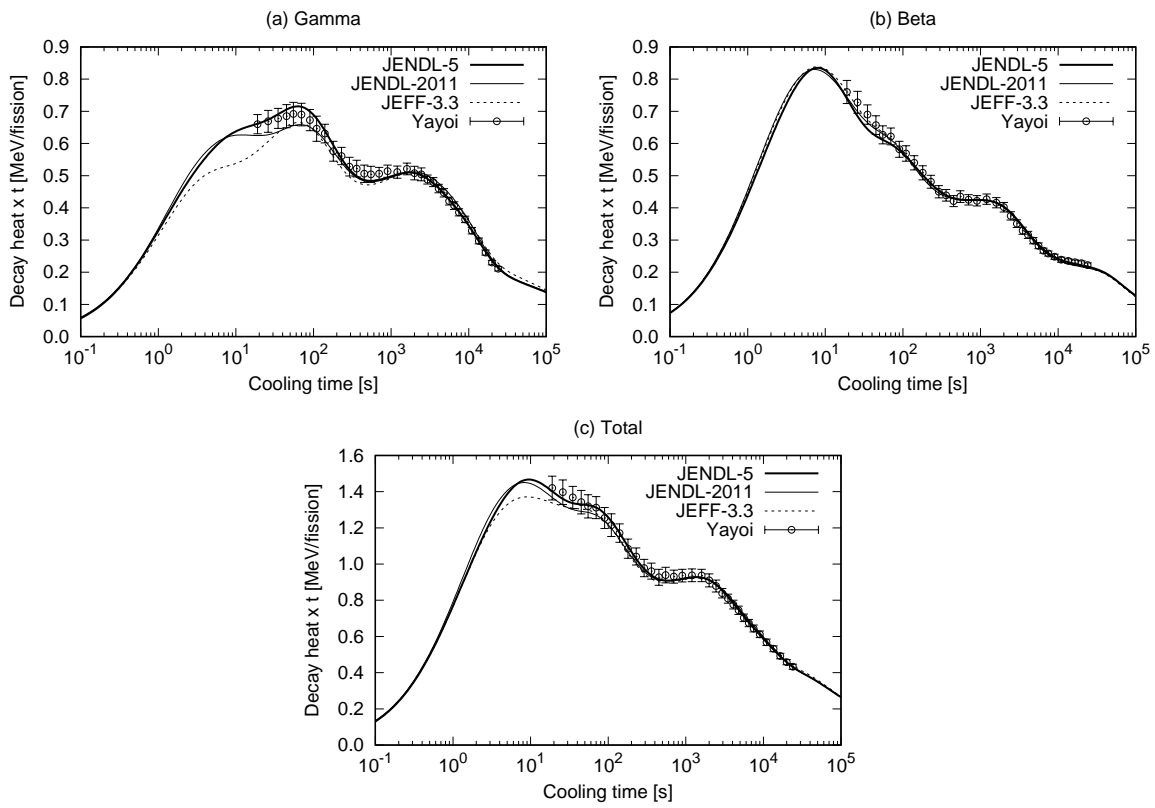


Figure 4: Decay heat after fission burst of U-235 by fast neutron

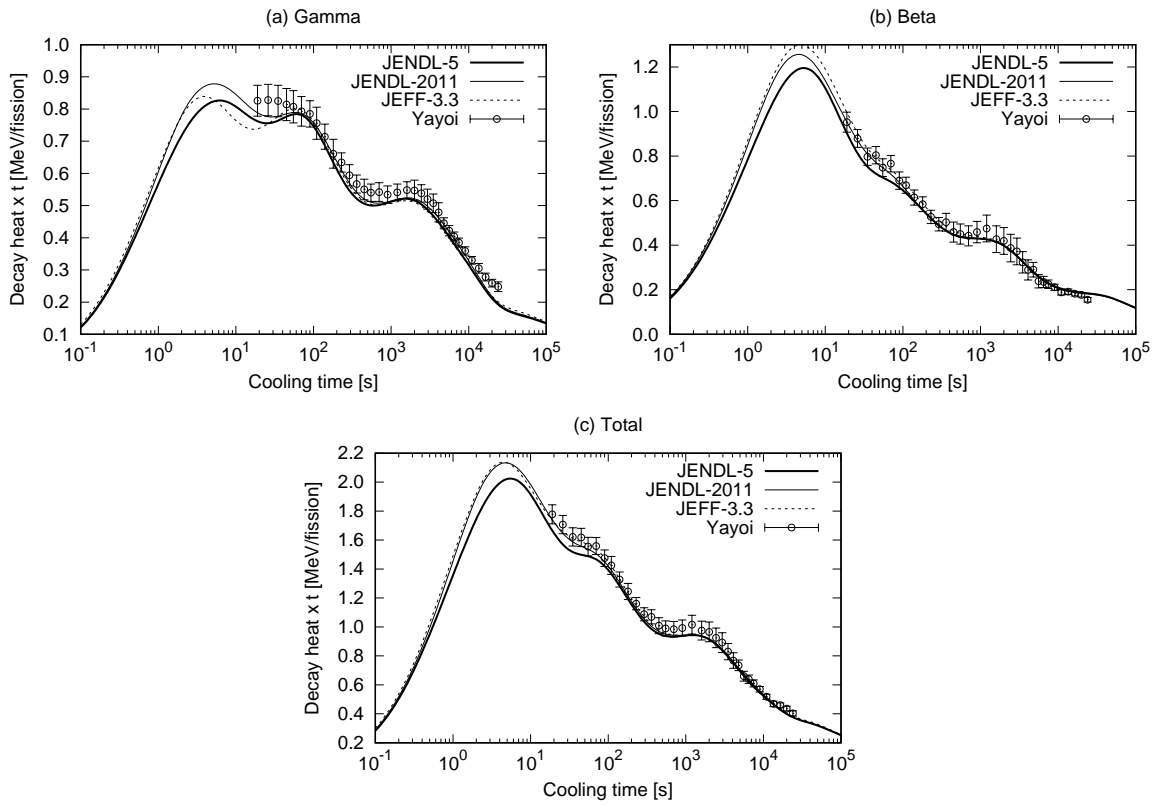


Figure 5: Decay heat after fission burst of U-238 by fast neutron

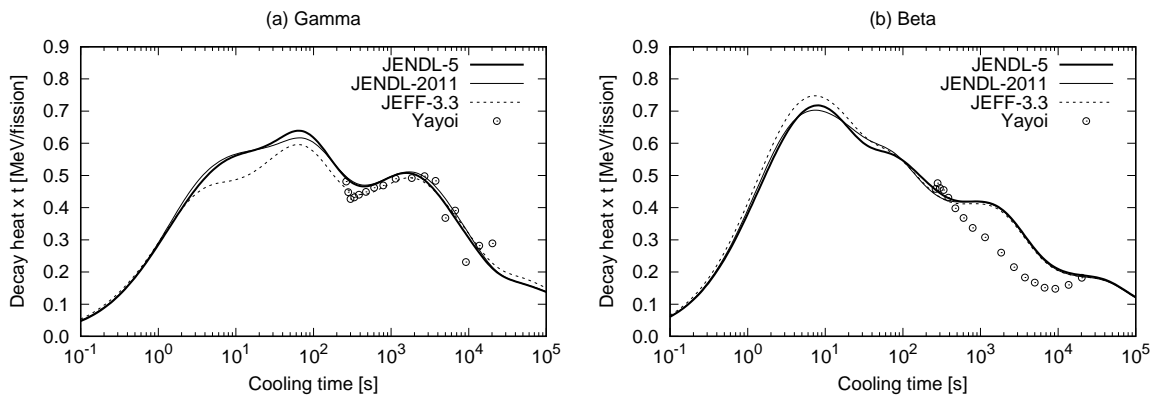


Figure 6: Decay heat after fission burst of Np-237 by fast neutron

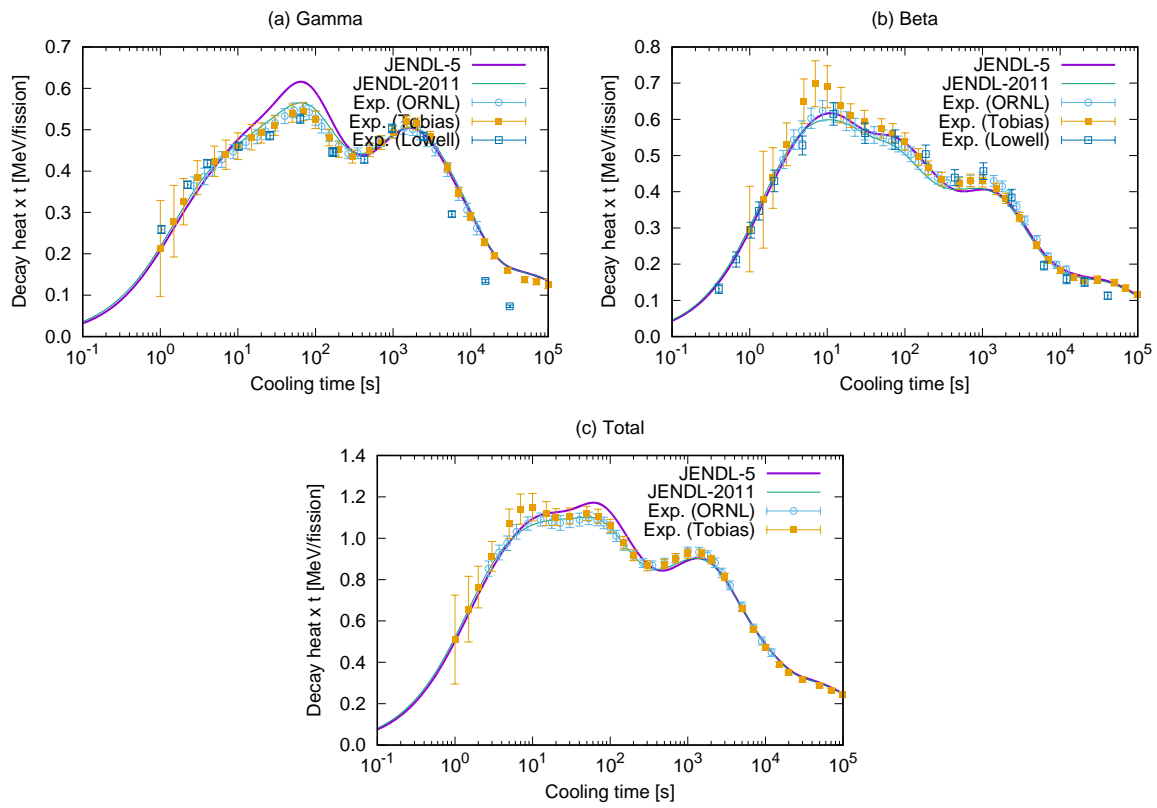


Figure 7: Decay heat after fission burst of Pu-239 by thermal neutron

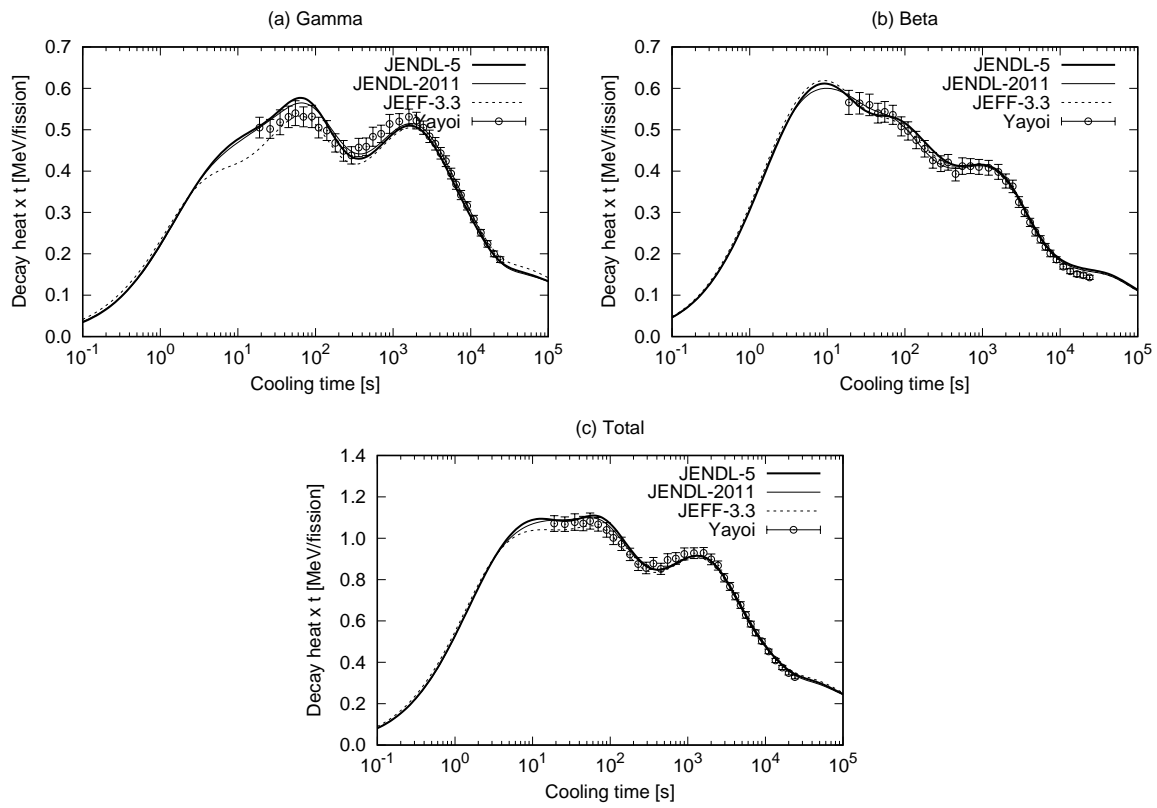


Figure 8: Decay heat after fission burst of Pu-239 by fast neutron

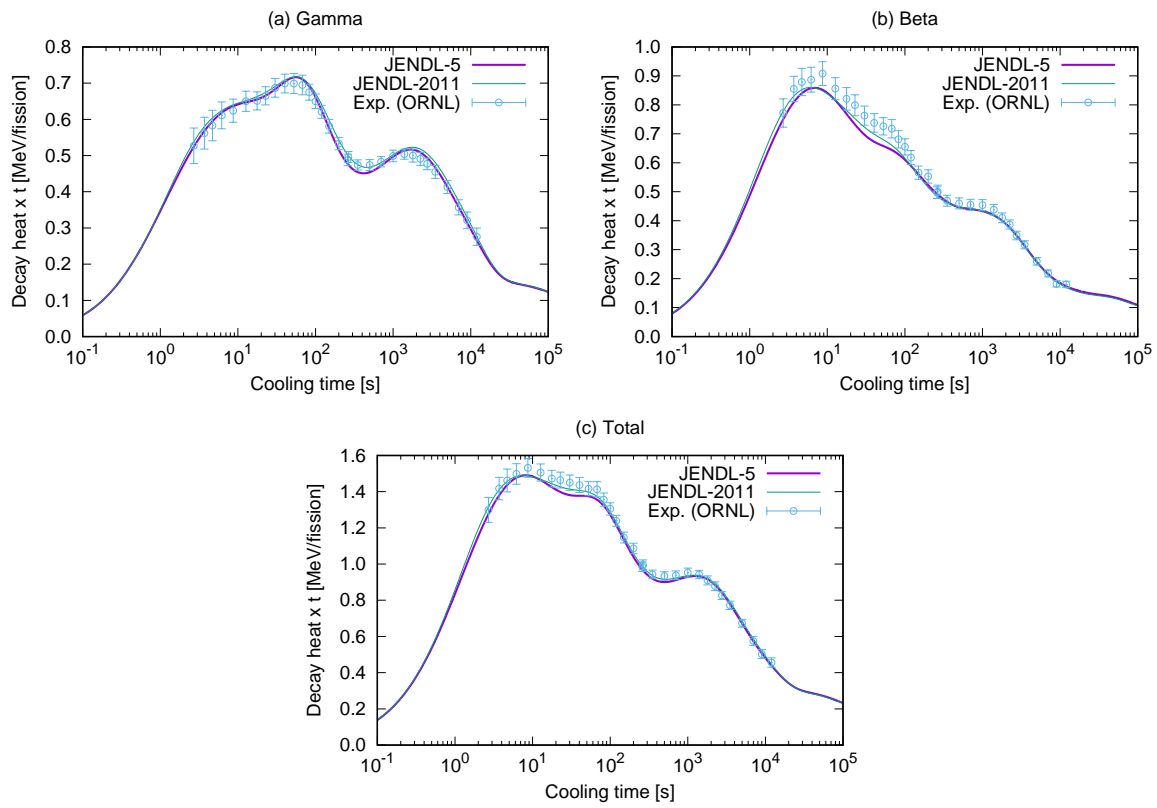


Figure 9: Decay heat after fission burst of Pu-241 by thermal neutron

2 Finite irradiation

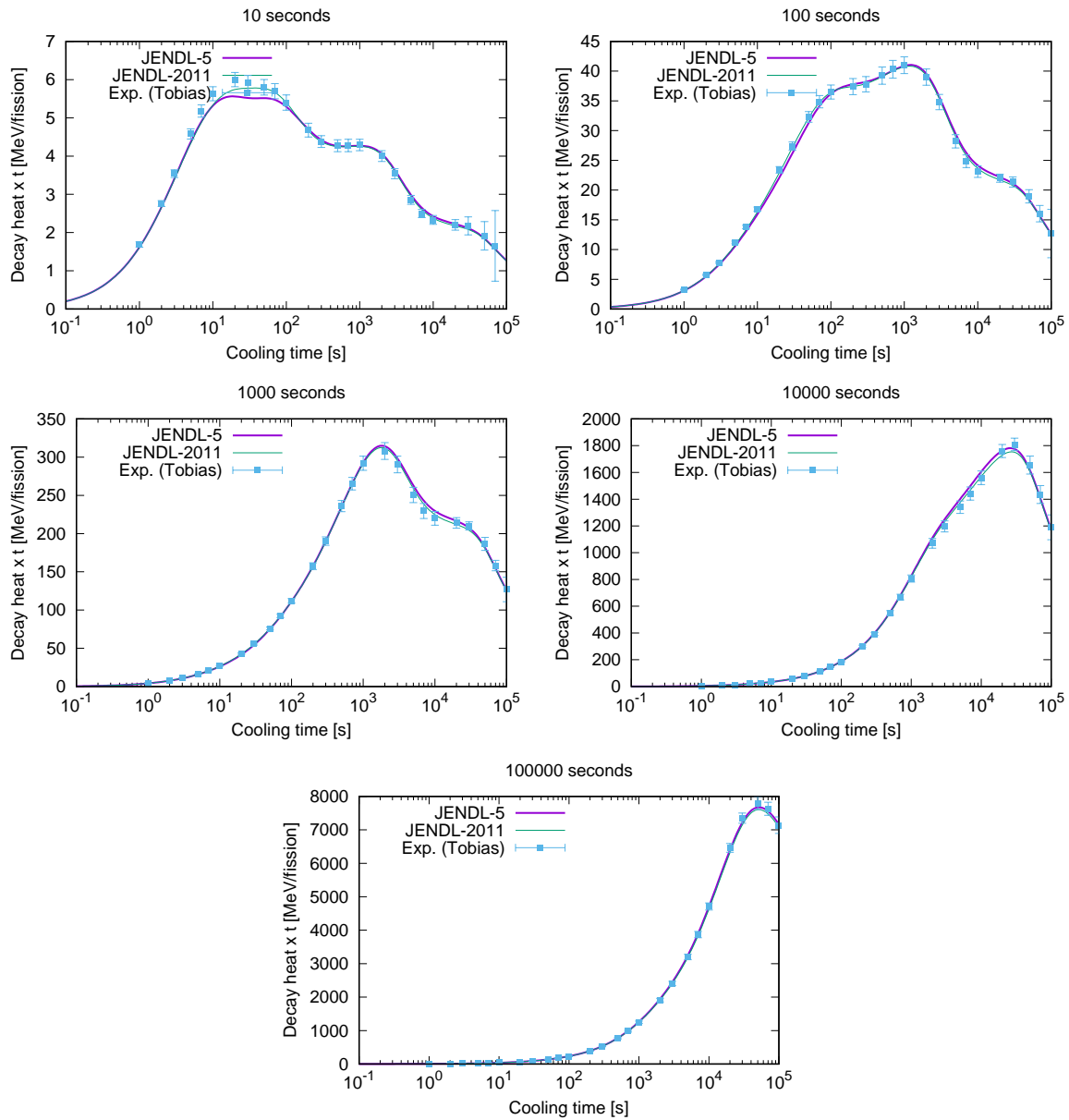


Figure 10: Beta decay heat after finite irradiation of U-235 by thermal neutron

References

- [1] Iwamoto O, Iwamoto N, Kunieda S, et al. Japanese evaluated nuclear data library version 5: JENDL-5. J Nucl Sci Technol. 2023; 60:1-60.

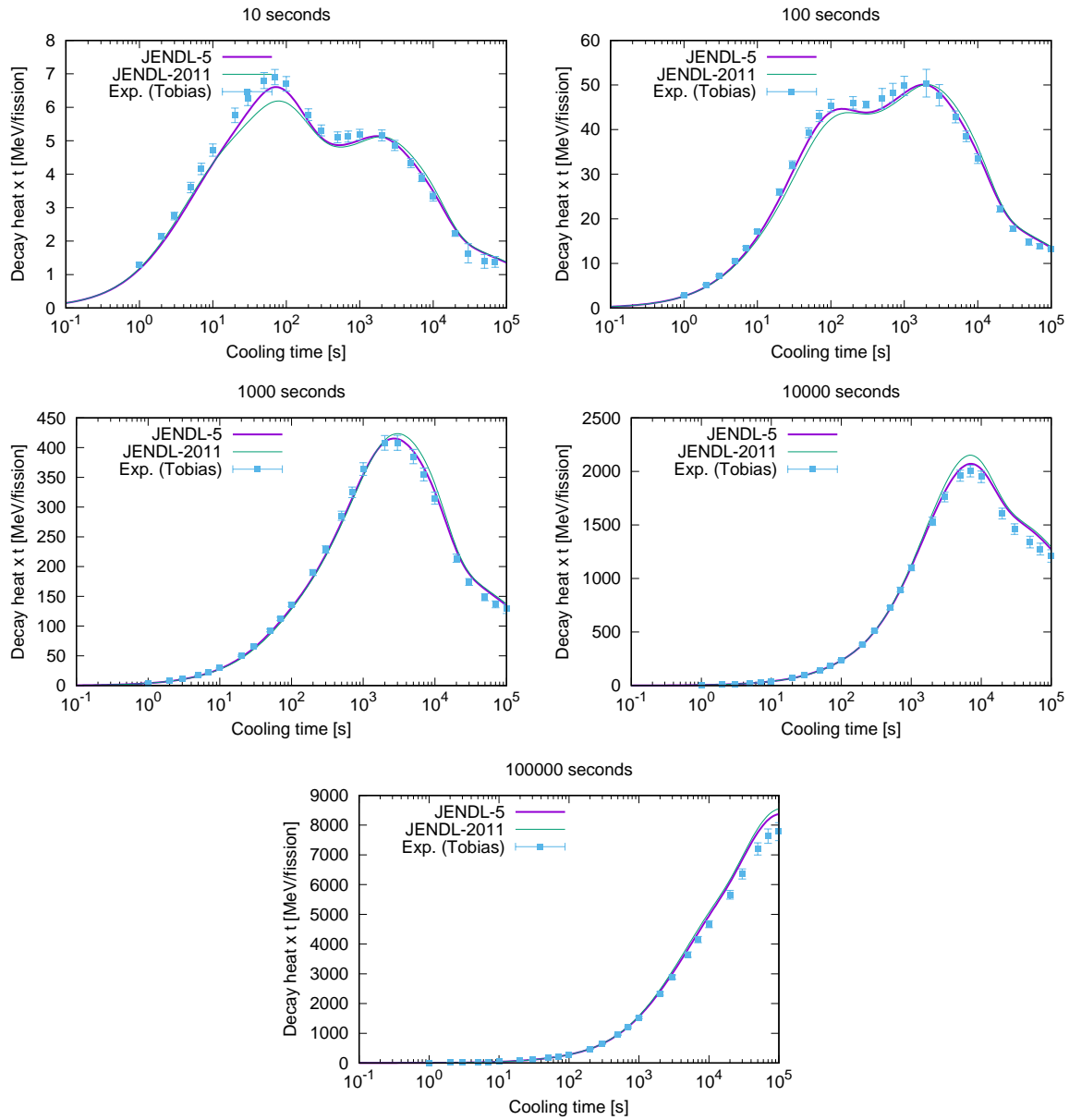


Figure 11: Gamma decay heat after finite irradiation of U-235 by thermal neutron

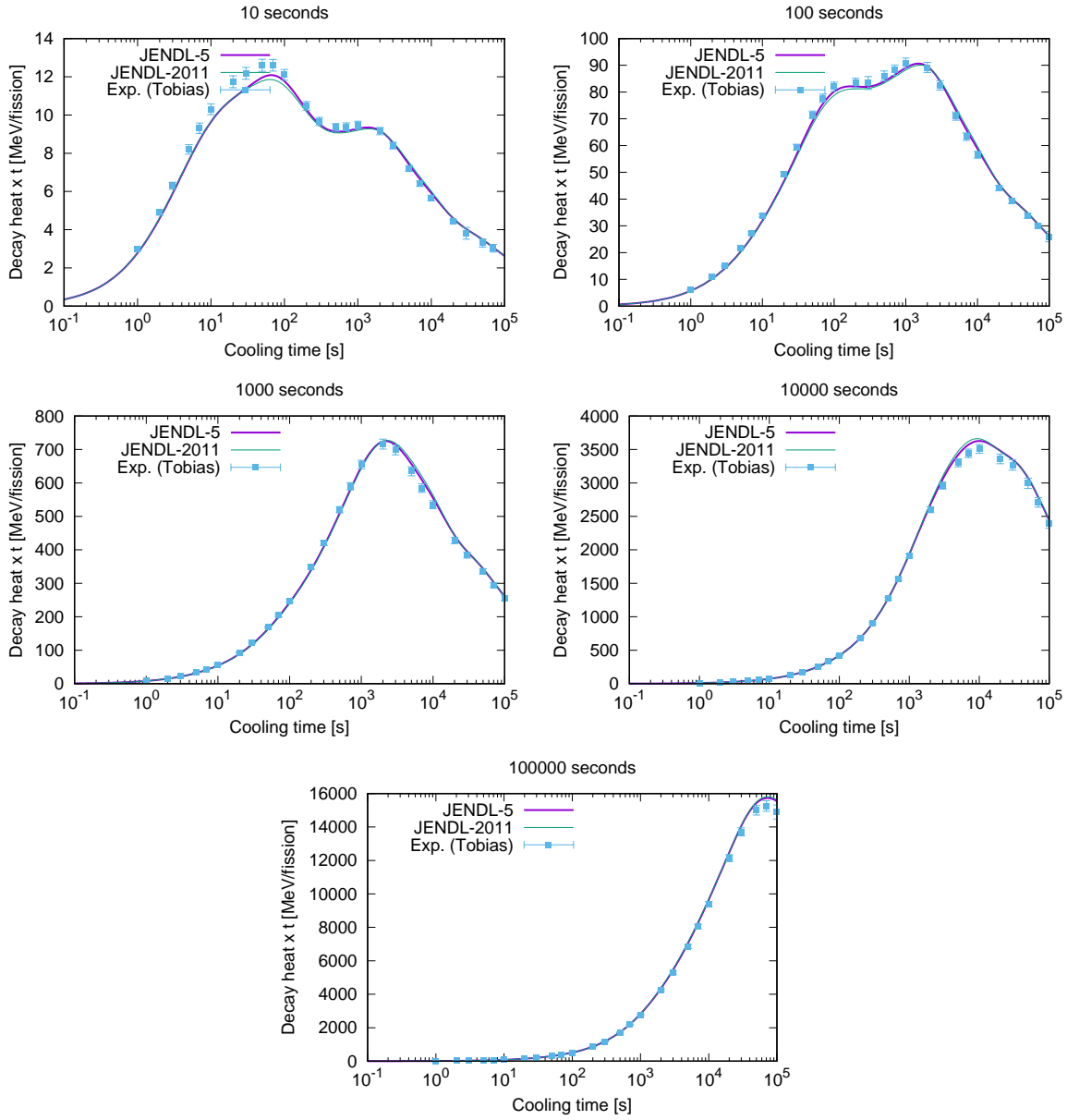


Figure 12: Total decay heat after finite irradiation of U-235 by thermal neutron

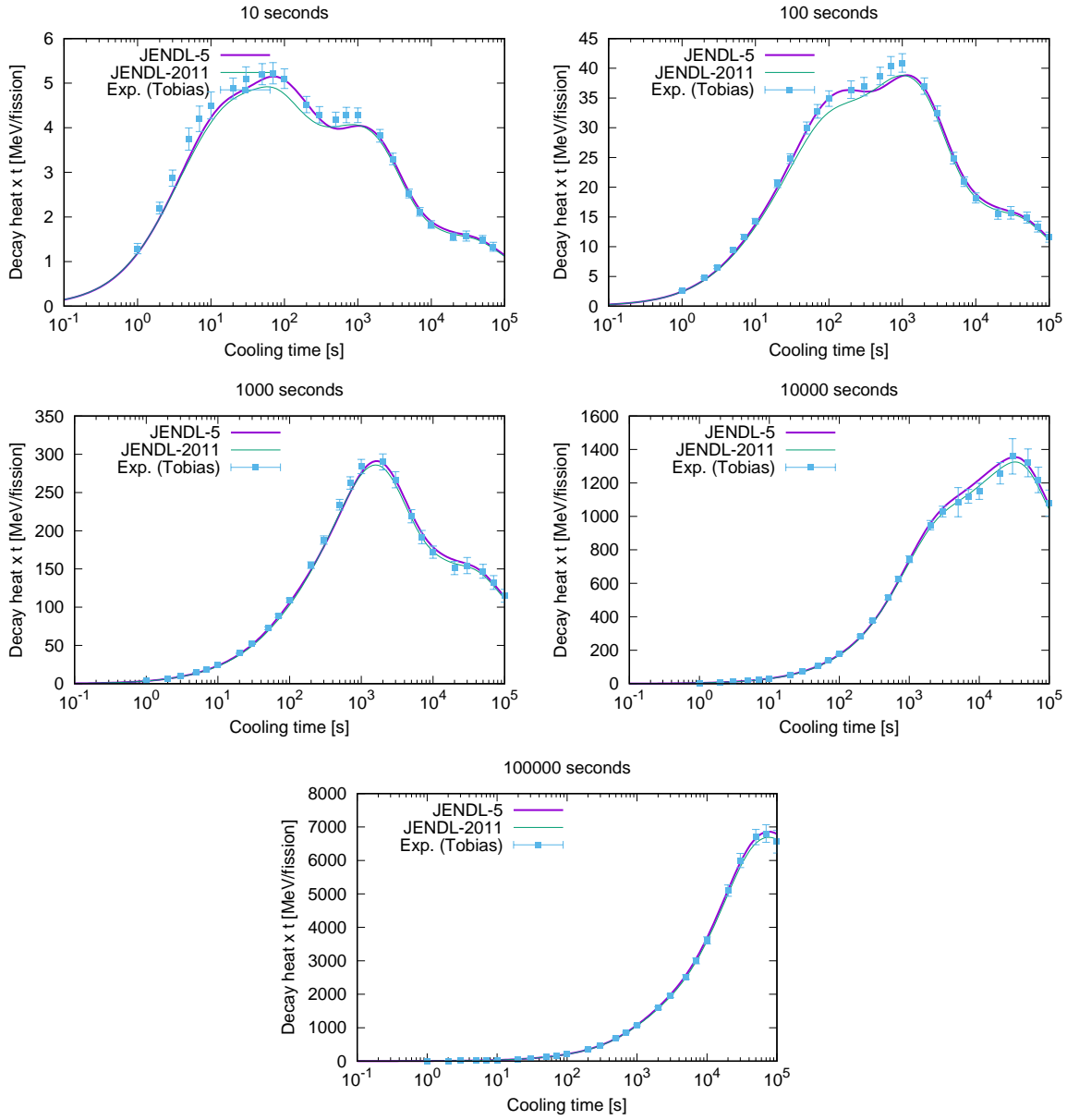


Figure 13: Beta decay heat after finite irradiation of Pu-239 by thermal neutron

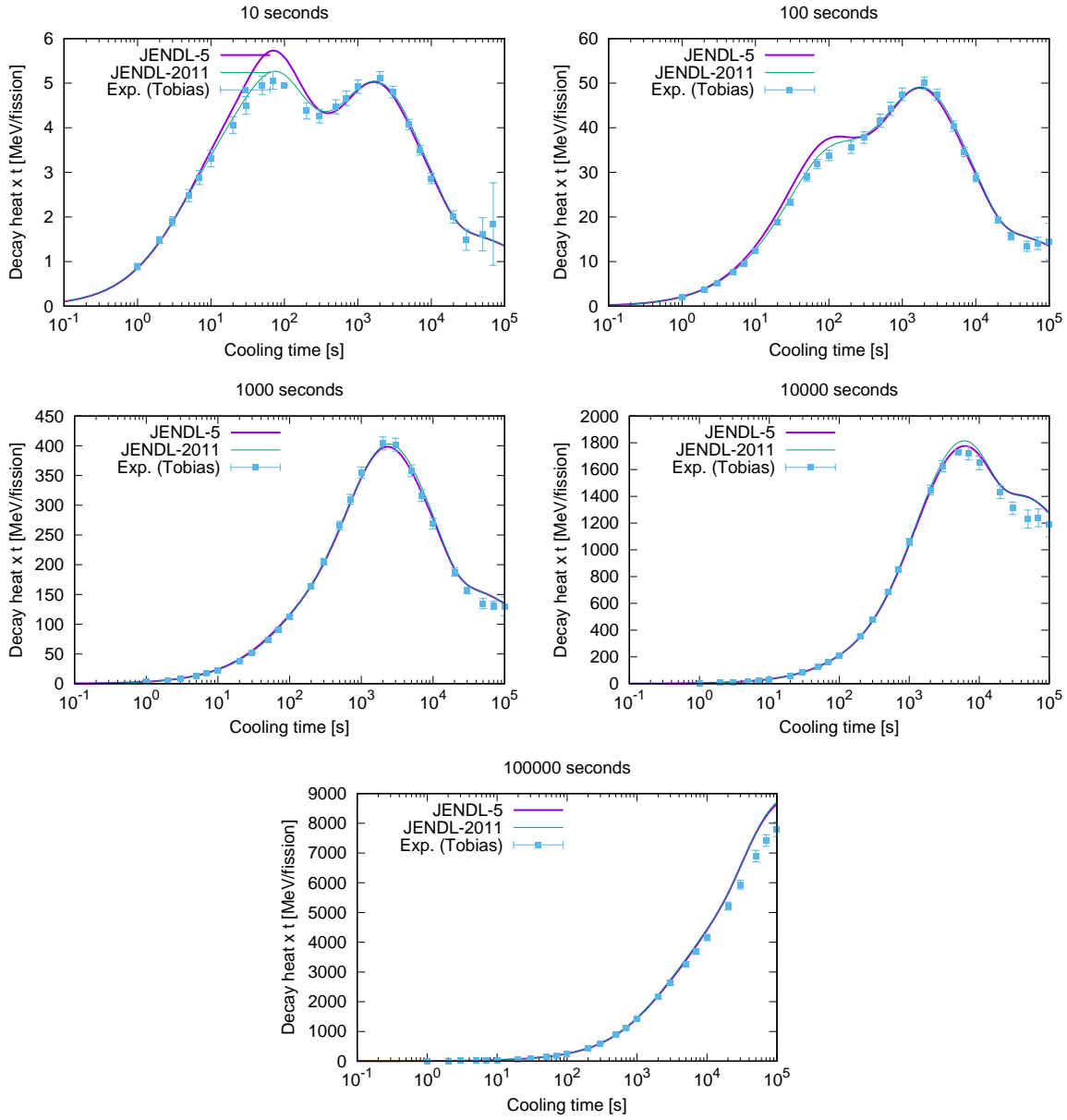


Figure 14: Gamma decay heat after finite irradiation of Pu-239 by thermal neutron

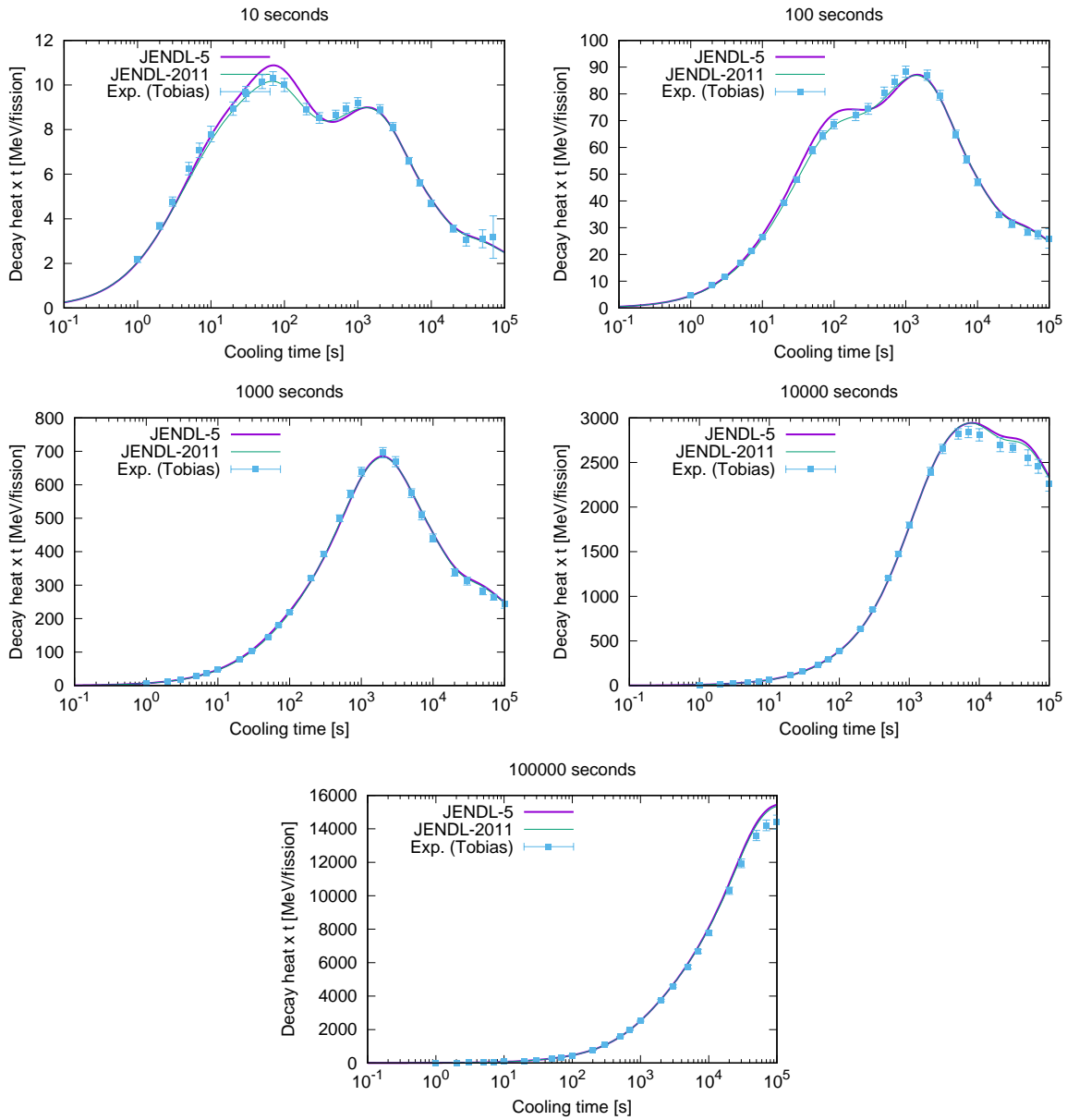


Figure 15: Total decay heat after finite irradiation of Pu-239 by thermal neutron