

Request ID	H464 (NEA=464)		Status of the request	Request to be checked	
Target	Reaction and process	Incident Energy	Secondary energy or angle	Target uncertainty	Covariance
93-NP-237	(n,f) SIG,DE	200KeV-20MeV	0	0	Y
Field	Subfield	Date Request created	Date Request accepted	Ongoing action	
Fission	fast reactors	11-MAY-15			

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Project (context): Los Alamos National Laboratory

Impact:

- The Np-237 fission cross section has impact for certain fast nuclear reactor designs. A sensitivity study by Aliberti et al. [1] pointed to a target accuracy of 8% for this cross section for Sodium-cooled Fast Reactor of the Gen-IV type (high level waste recycling).
- WPEC Subgroup-26 [2]: Present uncertainty (BOLNA) 6-8% from 0.5-6 MeV. Required uncertainty for an Accelerator Driven Minor Actinide Burner (ADMAB): 1.5-4 %.
- For many measurements the $^{237}\text{Np}(n,f)$ is a reference cross section that is valuable on account of its low fission threshold and moderate activity.

Accuracy:

Uncertainties of 2-3%

Justification document:

There is a discrepancy of about 6-9% between a recent measurement performed by the n_TOF collaboration and ENDF/B-VII (C. Paradela et al. [3]).

The higher n_TOF values are supported by a validation exercise by Leong et al. [4].

A recent independent result in the energy range from 4.8 to 5.6 MeV yields cross sections that in function of energy first agree with ENDF/B-VII and then with the n_TOF result (M. Diakaki et al. [5]).

Independently an issue was recently found when cross sections for Pu-isotopes referred to the $^{238}\text{U}(n,f)$ cross section were compared to the same cross sections referred to the $^{237}\text{Np}(n,f)$ cross section in the same measurement arrangement (P. Salvador et al. [6]).

Comment from requester:

Comments from evaluator/experimentalist:

Comments for achieved accuracy:

Review comment:

The request is well motivated and of some concern also to reactor dosimetry when using spectral indices and/or reaction rates of ^{237}Np fission chambers (IRDFF [7]).

Additional file attached:

References:

- [1] G. Aliberti et al., Annals of Nuclear Energy 33 (2006) 700–733.
 [2] M. Salvatores et al., Nuclear Science NEA/WPEC-26, www.oecd.org.
 [3] C. Paradela et al., Phys. Rev. C 82 (2010) 034601; Korean Physical Society 59 (2011) 1519.
 [4] L.S. Leong et al., Annals of Nuclear Energy 54 (2013) 36.

[5] M. Diakaki et al, Nuclear Data Sheets 119 (2014) 52.

[6] P. Salvador et al., Nuclear Data Sheets 119 (2014) 55.

[7] International Reactor Dosimetry and Fusion File, <https://www-nds.iaea.org/IRDF/> (2014).