

Feedback Form for the High Priority Request List for nuclear data.

Description of the Entry

Entry number	29
Nuclide	^{23}Na
Quantity	(n,inel)
Target uncertainty	4-10%, depending on system
Date issued	12 Sep 2008

Compilers

David Brown (dbrown@bnl.gov)

Short summary.

The request as currently stated is resolved by the evaluation work of Archier et al. [1][2] and the testing of Salvatores et al. [3] as the target accuracy of the (n,inel) cross section was met in the requested energy ranges. That said, the testing by Lee and Brun [4] and in [3] only address the inelastic cross section. Below 2 MeV, the Archier et al. evaluation is based on an R-matrix fit to [5]. We comment that the experimental work reported in [5] requires confirmation since the reanalysis of experimental data in [7] call into question older experiments that [5] was meant to confirm .

However, it is known from the study of other critical assemblies [8] and from the work of WPEC Subgroup 35 that the angular distributions from (n,inel) play a disproportionate role in the leakage from small systems and the impact of the (n,inel) angular distributions in critical assemblies has not been addressed. The experimental work in [9] is addressing this need.

Table with the overview of activities since the request was issued.

Nature of feedback ¹⁾	Quantity addressed ²⁾	Achieved Uncertainty ³⁾	Organisation	Contact person ⁴⁾	Reference ⁵⁾
Experiments resulting in new microscopic data	(n,inel)	5% for $E < 2\text{MeV}$, 10% for $E > 2\text{MeV}$	JRC-Geel, Retieseweg, 2440 Geel, Belgium	A.J.M. Plompen, C. Rouki	[5]
	(n,inel) cross section and angular distribution		U. Kentucky, Lexington, Kentucky, USA	J.R. Vanhoy	[8]

Integral experiments providing new benchmark data					
Validation feedback	keff in 2 ABR-1000 MOX core assemblies	N/A	CEA-Saclay	Y.-K. Lee, E. Brun	[4]
	Na void reactivity, ZPPR-9 assemblies	N/A	CEA-Cadarache, INL, ANL, BNL, many others	M. Salvatores, et al.	[3]
New evaluations	(n,inel), full evaluation	5% for E < 2MeV; 10% for E > 2 MeV	CEA-Cadarache	P. Archier, G. Noguère, C. De Saint Jean	[1], [2]
	(n,inel), covariance only	10-20% for E < 2 MeV; 8% for E > 2 MeV	BNL, LANL	M. Herman	[9]
Current interest ⁶⁾	Sensitivities	N/A	INL, CEA-Cadarache, ANL, BNL, many others	G. Palmiotti, et al.	[7]
	(n,inel), (n,tot) cross section	N/A	JRC-IRMM, Retieseweg, 2440 Geel, Belgium	S. Kopecky and A.J.M. Plompen	[6]

Notes

- 1) *Nature of feedback. Please provide one line per new activity. Order the activities according to the four headings indicated in this column.*
- 2) *Quantity addressed. The quantity may differ from the target quantity of the entry on the HPRL but should have a well-established link with the target quantity of the entry. The aim is to provide a complete set of references to all works of interest to new evaluations of the target quantity.*
- 3) *Achieved uncertainty. Give the best number obtained by the activity. It is for the evaluator to sort out the details concerning the best use of the results of the activity. If important, provide further details in the short summary.*
- 4) *Contact person. Ideally we have a name and email address here. Please consult with the person concerned to obtain his consent to advertising these personal details on the NEA webpage and this form.*
- 5) *Reference. A citation referring to the list of references below.*
- 6) *Current interest. If new support for the request from sensitivity analysis, feedback from validation or otherwise is available this should be mentioned and it should be indicated whether the request must be modi-*

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fied in the short summary (ie tighter uncertainty, different energy range, emphasis on associated quantities...).

References

- [1] P. Archier, G. Noguère, C. De Saint Jean, A.J.M. Plompen, C. Rouki, “New JEFF-3.2 Sodium Neutron Induced Cross-sections Evaluation for Neutron Fast Reactors Applications: from 0 to 20 MeV”, Nuclear Data Sheets 118 (2014) 140–143.
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- [3] M. Salvatores, et al. “Methods and Issues for the Combined Use of Integral Experiments and Covariance Data: Results of a NEA International Collaborative Study”, Nuclear Data Sheets 118 (2014) 38–71.
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Feedback Form for the High Priority Request List for nuclear data.

Description of the Entry

Entry number	7,34
Nuclide	^{56}Fe
Quantity	(n,Xn) DDX, (n,n') cross section
Target uncertainty	2-15% (#34), 33% (#7)
Date issued	16 Apr 2007 (#7) 12 Sep 2008 (#34)

Compilers

David Brown (dbrown@bnl.gov), Arjan Plompen (arjan.plompen@ec.europa.eu).

Short summary.

^{56}Fe evaluation is an ongoing activity under WPEC Subgroup 40 (CIELO). The request has not yet been resolved and neither target accuracy has been reached. New experimental results are under way for cross section and angular distributions [1] and are already available for the cross section from Refs. [2] and [3]. Reference [4] has an important comment about the level structure of the nucleus. Semi-integral and validation experiments were carried out in Refs. []. The sensitivity studies in Ref. [10]-[12] should help guide evaluators.

Table with the overview of activities since the request was issued.

Nature of feedback ¹⁾	Quantity addressed ²⁾	Achieved Uncertainty ³⁾	Organisation	Contact person ⁴⁾	Reference ⁵⁾
Experiments resulting in new microscopic data	(n,inel) cross section and angular distribution		U. Kentucky, Lexington, Kentucky, USA	J. Vanhoy	[1]
	(n,inel) cross section		HZDR	A. Junghans	[2]
	(n,inel) cross section	5%	JRC-Geel, IFIN-HH	A. Negret, A.J.M. Plompen	[3]
	Level scheme	N/A	LANL	N. Fotiades	[4]
Integral experiments providing new	Semi-integral scattering data. (elas-	3%	RPI	Y. Danon	[5]

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benchmark data	tic+inelastic)				
	PERLE Experiment	3% on data 2-6% adj. inel. 5-8% adj. elast. 3-20% adj. cap.	CEA Cadarache	C. Vaglio-Gaudard	[6][7]
Validation feedback	Reaction rates in ASPIS shielding benchmark	N/A	CEA Saclay	C. Jouanne	[8]
	Various metrics in SINBAD (shielding) and ICSBEP benchmarks	N/A	Jožef Stefan Institute	I. Kodeli	[9]
	keff, reaction rates in variety of assemblies	N/A	CEA-Cadarache, INL, ANL, BNL, many others	M. Salvatores	[10]
New evaluations	(n,inel) cross section covariance	10-12% for $E < 2$ MeV; 5% for $2 \text{ MeV} < E < 10$ MeV; 8% for $E > 10$ MeV	BNL, LANL	M. Herman	[11]
	(n,inel) cross section and angular distribution	N/A	ORNL	L. Leal	[12]
Current interest ⁶⁾	Sensitivities of model parameters to variety of critical assemblies	N/A	INL, CEA-Cadarache, ANL, BNL, many others	G. Palmiotti	[13]
	Sensitivities of model parameters to variety of critical assemblies	N/A	SCK-CEN, Mol, Belgium	A. Stankovskiy	[14]
	Sensitivities of model parameters to variety of critical assemblies	N/A	Uppsala University	J. Duan	[15]

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- 6) *Current interest. If new support for the request from sensitivity analysis, feedback from validation or otherwise is available this should be mentioned and it should be indicated whether the request must be modified in the short summary (ie tighter uncertainty, different energy range, emphasis on associated quantities...).*

References

- [1] J.R. Vanhoy, S.F. Hicks, B.R. Champine, B.P. Crider, E.A. Garza, S.L. Henderson, S.H. Liu, E.E. Peters, F.M. Prados-Estévez, M.T. McEllistrem, T.J. Ross, L.C. Sidwell, J.L. Steves, S.W. Yates, "Differential Cross Section Measurements at the University of Kentucky -- Adventures in Analysis", NEMEA-7 Conference Proceedings, 2013, Geel, Belgium, NEA/NSC/DOC(2014)13, OECD-NEA (2014).
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- [13]G. Palmiotti, et al. "Combined Use of Integral Experiments and Covariance Data", Nuclear Data Sheets 118 (2014) 596–636.
- [14]A. Stankovskiy, G.Van den Eynde, C.J.Diez, O.Cabellos, P.Schillebeeckx, J.Heyse, "Sensitivity analysis of the nuclear data for MYRRHA reactor modeling", NEMEA-7 Conference Proceedings, 2013, Geel, Belgium, NEA/NSC/DOC(2014)13, OECD-NEA (2014).
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