

DE LA RECHERCHE À L'INDUSTRIE



WPEC Subgroup C —— HPRL —— High Priority Request List for Nuclear Data

www.oecd-nea.org/dbdata/hprl

Emmeric DUPONT for EG-HPRL (SG-C)

www.cea.fr





- ① Governance
- ② Progress report
- ③ Deliverables

① Governance – Membership

- Expert members: experimentalists, evaluators, and (too few) users
- Representatives of nuclear data evaluation projects or countries
 - ENDF: Y. Danon (RPI)
 - JEFF: E. Dupont (CEA), A. Plompen (EC-JRC-Geel), G. Rimpault (CEA)
 - JENDL: O. Iwamoto (JAEA), N. Iwamoto (JAEA), T. Iwasaki (Tohoku),
A. Kimura (JAEA), K. Yokoyama (JAEA)
 - BROND: V. Pronyaev (IPPE), V. Koscheev (IPPE)
 - CENDL: Zhigang Ge (CIAE), Xichao Ruan (CIAE), Sun Weili (IAPCM),
Haicheng Wu (CIAE)
 - IAEA: R. Capote, A. Koning, A. Trkov
 - Korea: Young-Ouk Lee (KAERI)
 - Romania: A. Negret (IFIN-HH)
 - NEA: M. Fleming



① Governance – Procedures

- New requests
 - Can be submitted online or by email to NEA or to the SG-C coordinator
 - Are reviewed by SG-C using the “wpec-sgc” mailing list within a few weeks
 - Are uploaded by NEA/Coordinator and advertise to the “hpri” mailing list

- Monitoring of activities related to HPRL entries
 - Is made by the requesters and all SG-C members who inform the NEA/Coordinator of new relevant publications and activities
 - The online list of related publications is updated on a regular basis by the NEA/Coordinator who inform all SG-C members of this update

- Decisions on entry status
 - Are made by SG-C (and WPEC) at their annual meeting



① Governance – Entry status

- Entry status (adopted in May 2018)
 - (1) Work in progress
covers all experimental and theoretical activities
 - (2) Pending new evaluation or validation
for requests that have already stimulated a lot of activities, but are not completed yet because of the lack of new evaluation or validation
 - (3) Completed (or Archived)
for requests that have been satisfied or that are no longer relevant (consensus required)

- Caution: keep in mind impact on activities when closing an entry



- ① Governance
- ② **Progress report**
- ③ Deliverables



② Progress report – Update of the database/tools, website

HPRL website at www.oecd-nea.org/dbdata/hpri

- New features implemented since June 2018
 - Direct access to the subcategories SPQ-dosimetry and SPQ-standards
 - Upload of the contents of the “feedback table” for each entry:
 - Main recent references (experiments, theory/evaluation, validation)
 - Entry Status: “Work in progress”, “Pending new evaluation or validation”, or “Completed”
 - Archiving of “Completed” entries, which are no longer visible by default
- Many thanks to NEA staff for their continuous support

② Progress report – Update of the database/tools, website

Home	About Us	News	Work Areas	Data Bank	Publications	Delegates' Area
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 Search


Data Bank » Nuclear Data Services

NEA Nuclear Data High Priority Request List

HPRL Main	High Priority Requests (HPR)	General Requests (GR)	Special Purpose Quantities (SPQ)	New Request	EG-HPRL (SG-C)
			Standard		
			Dosimetry		

The NEA Nuclear Data High Priority Request List (HPRL), is a compilation of the most important nuclear data requirements. The purpose of the list is to provide a guide for those planning measurement, nuclear theory and evaluation programmes. See also the [historical background](#) to the present request list.

The list is maintained by the NEA Working Party on International Nuclear Data Evaluation Cooperation (WPEC).

Requests are divided in three main categories:

1. High priority requests
2. General requests
3. Special purpose quantities

 Search list

For more information and feedback please contact wpec@oecd-nea.org

- Latest JEFF Libraries**
JEFF-3.3
- Evaluated Releases**
BROND-3.1
ENDF/B-VIII.0
JEFF-3.3
JENDL-4.0
TENDL-2017
- Other Libraries (description)**
- Evaluated Archive**
- 2019 Events**
24-26 April - JEFF Meetings, NEA
19-24 May - Nuclear Data 2019, Beijing

Direct access to the lists

Search engine

② Progress report – Update of the database/tools, website

Request ID	36		Type of the request	High Priority request	
Target	Reaction and process	Incident Energy	Secondary energy or angle	Target uncertainty	Covariance
92-U-238	(n,g) SIG	20 eV-25 keV		See details	Y
Field	Subfield	Created date	Accepted date	Ongoing action	Archived Date
Fission	Fast and Thermal Reactors	15-SEP-08	15-SEP-08		16-MAY-18

Entry Status:

Completed (as of SG-C review of May 2018)

Main recent references:

Please report any missing information to hprlinfo@oecd-nea.org

Experiments

- A. Wallner et al., Novel Method to Study Neutron Capture of ²³⁵U and ²³⁸U Simultaneously at keV Energies, [PRL 112 \(2014\) 192501](#), [EXFOR 23170](#)
- J.L. Ullmann, et al., Cross section and g-ray spectra for ²³⁸U(n,g) measured with the DANCE detector array at the Los Alamos Neutron Science Center, [PRC 89 \(2014\) 034603](#), [EXFOR 14310](#)
- H.I. Kim et al., Neutron capture cross section measurements for ²³⁸U in the resonance region at GELINA, [EPJ A 52 \(2016\) 170](#), [EXFOR 23302](#)
- F. Mingrone et al., Neutron capture cross section measurement of ²³⁸U at the CERN n_TOF facility in the energy region from 1 eV to 700 keV, [PRC 95 \(2017\) 034604](#), [EXFOR 23234](#)
- T. Wright et al., Measurement of the ²³⁸U(n,g) cross section up to 80 keV with the Total Absorption Calorimeter at the CERN n_TOF facility, [PRC 96 \(2017\) 064601](#)


Theory/Evaluation


- H. Derrien et al., R-Matrix Analysis of ²³⁸U High-Resolution Neutron Transmissions and Capture Cross Sections in the Energy Range 0 to 20 keV, [NSE 161 \(2009\) 131](#)
- R. Dagan et al., Impact of the Doppler Broadened Double Differential Cross Section on Observed Resonance Profiles, ND2013, [NDS 118 \(2014\) 179](#)
- Kopecky et al., Status of Evaluated Data Files for ²³⁸U in the Resonance region, JRC Technical Report, EUR 27504 EN (2015)
- R. Capote et al., IAEA CIELO Evaluation of Neutron-induced Reactions on ²³⁵U and ²³⁸U Targets, [NDS 148 \(2018\) 254](#)
- A.D. Carlson et al., Evaluation of the Neutron Data Standards, [NDS 148 \(2018\) 143](#)

Validation

② Progress report – Update of the database/tools, website

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 **NEA**
NUCLEAR ENERGY AGENCY

Search  **OECD**
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Data Bank » Nuclear Data Services

NEA Nuclear Data High Priority Request List, HPRL

HPRL Main	High Priority Requests (HPR)	General Requests (GR)	Special Purpose Quantities (SPQ)		New Request	EG-HPRL (SG-C)
			Standard	Dosimetry		

Selected request list:

High priority General Special purpose quantities To be checked

Selection filters

Select Z (ex. Pu): Select A (ex. 239):
 Select Reaction (ex. n,2n): Select Quantity (ex. sig):

Archived

View results with:

Comments Requester details

Sort results by

ID Target Quantity Reaction Date Type

Selection of HPRL categories

Access to completed requests

② Progress report – Update of the database/tools, website

NEA Nuclear Data High Priority Request List

HPRL Main	High Priority Requests (HPR)	General Requests (GR)	Special Purpose Quantities (SPQ)		New Request	EG-HPRL (SG-C)
			Standard	Dosimetry		

Results of your search in the request list

Requests are shown from the following list(s):

High Priority (H)

General (G)

Archived (A)

Special Purpose Quantities (SPQ)

Explanations of each column can be found in the table heads. To view the details of a request, please click on the **link symbol** after the request ID.

To send a comment on a particular entry, please view the request, and click on the **'letter'** symbol there.

ID	View	Target	Reaction	Quantity	Energy range	Sec.E/Angle	Accuracy	Cov Field	Date
1GA		14-SI-28	(n,np)	SIG	Threshold-20 MeV	4 pi	20	Y Fusion	23-MAR-07
5HA		72-HF-0	(n,g)	SIG	0.5 eV-5.0 keV		4	Y Fission	16-APR-07
7GA		26-FE-56	(n,xn)	SIG,DDX	7 MeV-20 MeV	1MeV-20MeV	30	Fission,ADS	16-APR-07
10GA		79-AU-197	(n,tot)	SIG	5 keV-200 keV		5	Science,Fusion	06-JUN-07
13GA		24-CR-52	(n,xd), (n,xt)	SIG	Threshold-65 MeV		20	Y Fusion	07-NOV-07
36HA		92-U-238	(n,g)	SIG	20 eV-25 keV		See details	Y Fission	15-SEP-08
40HA		14-SI-28	(n,inl)	SIG	1.4 MeV-6 MeV		See details	Y Fission	15-SEP-08
44HA		93-NP-237	(n,f)	SIG,DE	200 keV-20 MeV		2-3	Y Fission	18-MAY-15

Number of requests found: 8 (out of a total of 108 requests).

[Download consolidated output report](#)

② Progress report – Update of the database/tools, website

HPRL website at www.oecd-nea.org/dbdata/hpri

- Remaining features to discuss
 - Implementation of the “Status” and “Status date” fields in the database, search engine and search output
 - Possibility to have multiple requesters for a given entry

- New features to implement in the context of the NEA website upgrade
 - The NEA website will migrate to a Content Management System (CMS)
 - A demo HPRL website based on CMS is being prepared by NEA IT

② Progress report – Update of the database/tools, website



ABOUT US TOPICS



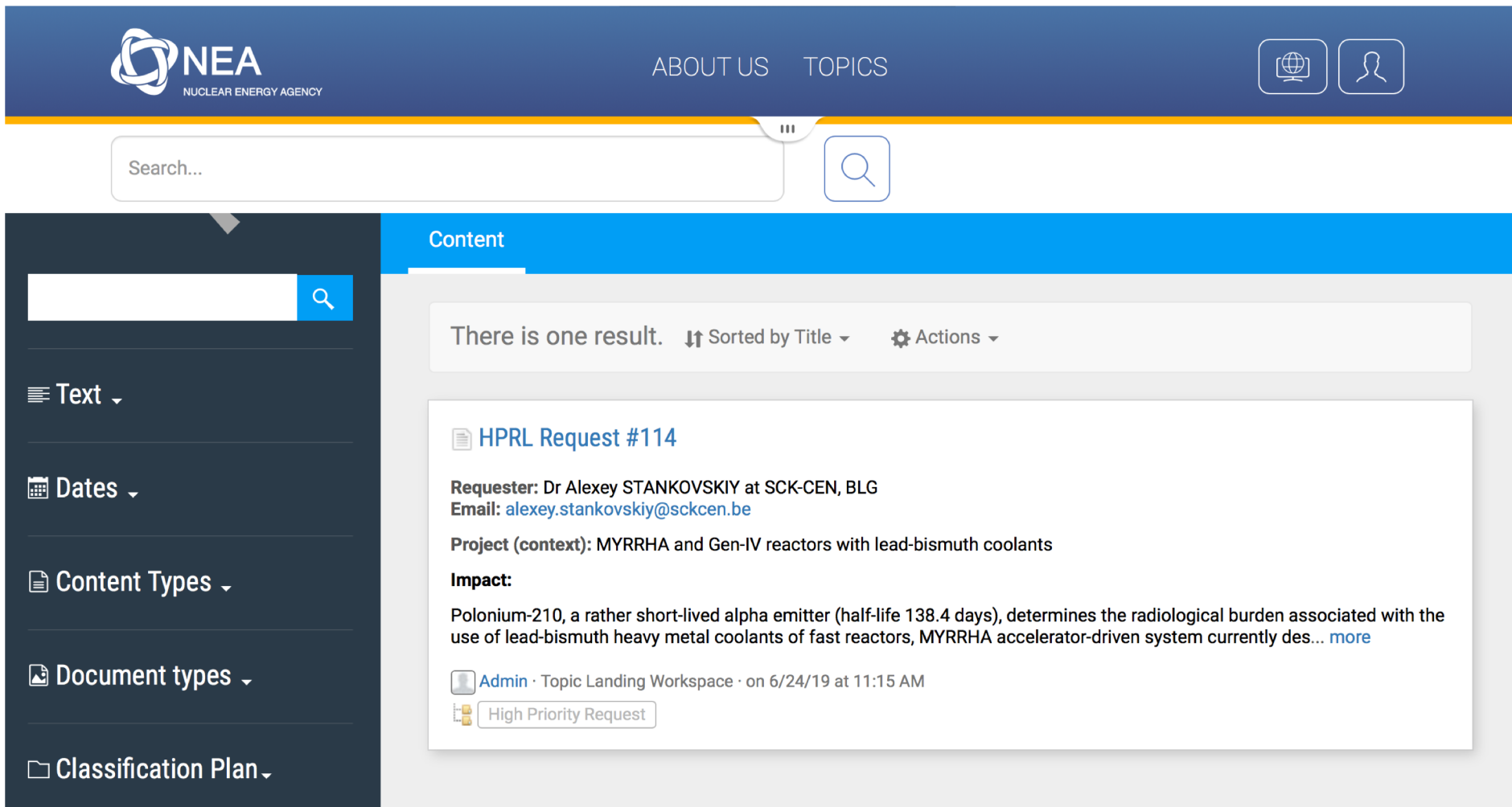
HPRL Request #114

Admin · on 6/19/19 at 10:09 PM

High Priority Request

Type	1. High Priority Request
Target	83-BI-209
Reaction	(n,g)Bi-210g,m BR
Quantity	BR
Description	<p>Requester: Dr Alexey STANKOVSKIY at SCK-CEN, BLG Email: alexey.stankovskiy@sckcen.be</p> <p>Project (context): MYRRHA and Gen-IV reactors with lead-bismuth coolants</p> <p>Impact:</p> <p>Polonium-210, a rather short-lived alpha emitter (half-life 138.4 days), determines the radiological burden associated with the use of lead-bismuth heavy metal coolants of fast reactors, MYRRHA accelerator-driven system currently designed at SCK-CEN, Belgium is one of the examples. It is produced via neutron capture on ²⁰⁹Bi forming the ground state of ²¹⁰Bi (half-life 5 days) which rapidly decays into ²¹⁰Po. ²¹⁰Bi has also long-lived (3 My) metastable state that can also be produced via neutron capture and that decays to ²⁰⁶Tl. Thus the knowledge of branching ratio between these two neutron capture channels is important to accurately predict the inventory of Polonium-210.</p>

② Progress report – Update of the database/tools, website



The screenshot displays the NEA (Nuclear Energy Agency) website interface. At the top, there is a navigation bar with the NEA logo, the text 'NUCLEAR ENERGY AGENCY', and links for 'ABOUT US' and 'TOPICS'. A search bar is located below the navigation bar. The main content area shows a search result for 'HPRL Request #114'. The result includes the requester's name and contact information, the project context, and the impact of the request. A sidebar on the left contains navigation options such as 'Text', 'Dates', 'Content Types', 'Document types', and 'Classification Plan'.

NEA
NUCLEAR ENERGY AGENCY

ABOUT US TOPICS

Search...

Content

There is one result. ↑↓ Sorted by Title ⚙️ Actions ▾

HPRL Request #114

Requester: Dr Alexey STANKOVSKIY at SCK-CEN, BLG
Email: alexey.stankovskiy@sckcen.be

Project (context): MYRRHA and Gen-IV reactors with lead-bismuth coolants

Impact:
Polonium-210, a rather short-lived alpha emitter (half-life 138.4 days), determines the radiological burden associated with the use of lead-bismuth heavy metal coolants of fast reactors, MYRRHA accelerator-driven system currently des... [more](#)

Admin · Topic Landing Workspace · on 6/24/19 at 11:15 AM

High Priority Request

Text ▾

Dates ▾

Content Types ▾

Document types ▾

Classification Plan ▾

② Progress report – Update of the database/tools, website

Table of requests (sortable by clicking on column headers)



[ABOUT US](#) [TOPICS](#)



Search...



	Type	Title ↑↓	Target ↑↓	Reaction ↑↓	Quantity ↑↓
1.	High Priority Request	HPRL Request #115	94-PU-239	(n,tot)	SIG
2.	High Priority Request	HPRL Request #114	83-BI-209	(n,g)Bi-210g,m BR	BR
3.	Special Purpose Quantity	HPRL Request #113	69-TM-169	(n,2n) SIG,SPA	SIG



② Progress report – Follow-up of entries

- Follow-up of accepted requests
 - Monitoring is under the responsibility of the requesters and SG-C
 - Relevant publications are compiled in the fields of
 - experiments,
 - theory/evaluation,
 - and validation.
 - Information from ND users and producers are obviously welcome
 - The status of every request is reviewed on the basis of the above information and SG-C expertise (taking into account ongoing activities)

② Progress report – Follow-up of entries

Updates in February (done) and June 2019 (ongoing)

- F. Belloni, et al., Neutron induced fission cross section measurements of ^{240}Pu and ^{242}Pu , EPJ Conf. 146 (2017) 04062
- M. Schulc, et al., Investigation of $^{127}\text{I}(n,2n)^{126}\text{I}$ and $^{23}\text{Na}(n,2n)^{22}\text{Na}$ reactions using ^{252}Cf neutron source, ASME J of Nuclear Rad Sci. 5 (2019) 030918
- M. Schulc, et al., Validation of selected **(n,2n) dosimetry reactions** in IRDFF-1.05 library, Applied Radiation and Isotopes 143 (2019) 132
- M. Mastromarco, et al. (n_TOF Collaboration), Cross section measurements of $^{155,157}\text{Gd}(n,g)$ induced by thermal and epithermal neutrons, EPJ A 55 (2019) 9
- T. Koglör, et al., Fast-neutron-induced fission cross section of ^{242}Pu measured at the neutron time-of-flight facility nELBE, PRC 99 (2019) 024604
- E. Pirovano, et al., Cross section and neutron angular distribution measurements of **neutron scattering on natural iron**, PRC 99 (2019) 024601



② Progress report – Review of entry status

- “*Work in progress*” is the default status for new entries
- Status for recent entries (2017-2019)
 - *Gd-155,157(n,g)*: “*Pending new evaluation or validation*”
 - *Other entries*: “*Work in progress*”
- Status for the (37) older entries (< 2017)
 - ~ 20% “*Completed*”
 - ~ 80% “*Work in progress*” (most of them actually)
“*Pending new evaluation or validation*” (for $^{206,207}\text{Pb}(n, \text{inl})$)
- Feedback from requesters and users is always welcome

② Progress report – Review of entry status

New SG-C proposals for the status of some entries
(discussed during SG-C & SG46 meetings this week)

- From “*Work in progress*” to “*Pending new evaluation or validation*”
 - Pu-239 and U-235 PFGS
 - Am-241(n,f)
 - Pu-242(n,g) (INDEN)
 - Na-23(n,n') (INDEN)
- “*Completed*”
 - U-235(n,g)

INDEN list of nuclides with the highest priority (12/2017):

Light elements:

N-14,15; Be-9; Na-23

Structural elements:

Co-59; Ni-58 (to check other Ni isotopes)

Actinides:

Pu-238,240,241,242

Re-evaluations (due to identified issues):

Fe-56,57 (issues in elastic cross sections and angular distributions from 0.85 up to 6 MeV)

Pu-239 (use of newly recommended thermal PFNS, thermal nubar, resonance region)

U-238 (14 MeV leakage issues traceable to inelastic spectra, PFNS for $E_n=5-8$ MeV)



② Progress report – New/Archived entries

New entries since June 2018

- 2 High priority requests + 1 update
 - Bi-209(n,g) BR; Pu-239(n,tot)
 - Update of 11G (^{239}Pu alpha ratio) is approved but not yet online
- 1 SPQ-dosimetry requests to improve $^{239}\text{Pu}(n_{\text{th}},f)$ PFNS high-energy tail
 - SACS of 10 well-known high-threshold dosimetry reactions in ^{239}Pu PFNS

Completed/Archived entries

- U-238(n,g); Hf-nat(n,g); Np-237(n,f); Si-28(n,inl); Fe-56(n,xn); Au-197(n,tot); Cr-52(n,xd/t); Si-28(n,np) → as agreed in May 2018; recently archived
- 11G (^{239}Pu alpha ratio) pending upload of the updated request



② Progress report – Additional requests

Overlapping requests from IAEA

- U-233 nubar between thermal and 5 eV (distributed, but not yet approved)
overlapping with request #9 by A. Bidaud
- U-233 alpha xs ratio between thermal and 5 eV (not distributed yet),
overlapping with request #9 by A. Bidaud

Possible additional requests

- Medical applications (on the basis on the latest recommendations from the IAEA TM on Nuclear Data for Medical Applications, Dec. 2018 + possible additions for n-induced reactions)
- Lack of data in the fast-range nubar (especially < 20 keV) for major fissile isotopes Pu-239,241 and U-233,235 (but no request so far)
- SG46 initiative on target accuracy requirements (update of SG26 recommendations)



- ① Governance
- ② Progress report
- ③ **Deliverables**

③ Deliverables

SG-C current mandate runs until June 2020

Deliverables

- A report on the status of all requests describing completed activities and outlook.
- ✓ An up-to-date online version of the “High Priority Request List for Nuclear Data”.

Issue with subgroup reports (my opinion)

- Time consuming and no/little added value for the authors (low impact, no/little citations, not indexed in major databases)

Proposal for SG-C

- For the mandate: deliver a NEA report essentially based on the ND2019 paper + a dump of the HPRL web pages in appendix; do that every 3 years
- For HPRL visibility/citation, and definitely more valuable for the authors, submit a paper in a refereed journal (Nuclear Data Sheets of January 2021?)

Thank you for your attention!

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