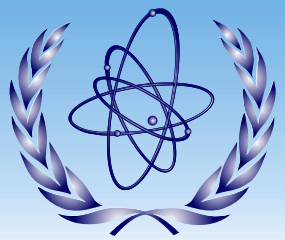


International Atomic Energy Agency

Nuclear Data Activities at the IAEA-NDS

A.J. Koning

Nuclear Data Section

Department of Nuclear Sciences and Applications

Outline

- NRDC
- NSDD
- EXFOR
- CRPs
- Training
- Android App
- Highlights

NRDC

- International Network of Nuclear Reaction Data Centres (NRDC)
- Aim:
  - EXFOR
- Core data centres:
  - NNDC
  - NEA-DB
  - IAEA-NDS
  - CJD
- 9 specialized centres
- Meeting Vienna, 21-23 April 2015 (without Centre Heads)
- Next: CNDC Beijing, June 7-10 2016 (with Centre Heads)

NSDD

- International Network of Nuclear Structure and Decay Data Evaluators (NSDD)
- Aim:
  - Provide up-to-date evaluated nuclear structure and decay data
- Regular meetings since 1974
- Last 20-24 April 2015 in Vienna see http://www-nds.iaea.org/nsdd/
- 18 evaluation centres
- ENSDF master database at NNDC

EXFOR

- Compiled experimental data
- The EXFOR database was established in the 1960s
- Originally exclusively neutron-induced reaction data
- Now includes charged particle data and higher energies
- Since 2003 the EXFOR libraries at the various data centres have been merged
- NDS has responsibility for the maintenance of this Master file

EXFOR (cont.)

- EXFOR Compilation Control System used to coordinate the compilation of the data centres
- The average time between publication and compilation remains steady ~ 6 months
- EXFOR contains data for more than 22,000 experiments, resulting in more than 13,000,000 data points, web content is updated monthly
- Continuing effort to remove errors and inconsistencies from the database

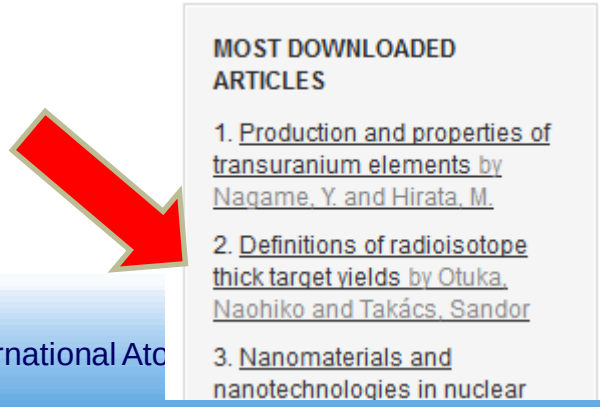
EXFOR (cont.)

- To make best use of these data considerable work on various retrieval and visualisation systems
- Output formats:
  - EXFOR+ format
  - XML and HTML
  - C4 format - numeric data in simple tables
  - C5 format – C4 + uncertainty split (stat/syst)
  - Standard EXFOR format
- Development of EXFOR-XML and possible unification with ENDF in frame of SG 38

EXFOR: Experimental Nuclear Reaction Data

- **~22 000 experiments compiled by Nuclear Reaction Data Centres.**
- **A journal article was published in 2014 for citation of EXFOR. More than 20 citations in 2015.**

- The 6th biennial Indian EXFOR workshop (January) compiled ~40 articles.
- An article was published in January to standardize definitions of radioisotope yields. The 2nd most downloaded article of the journal (Radiochim. Acta).



Collaborative International Evaluated Library" (CIELO) project

- Improve evaluated data for 1H, 16O, 56Fe, 235,238U and 239Pu
- Set up a CIELO network to continue this effort for more targets subject to availability of resources
- NDS leading in a large publication (CRP) effort

Prompt Fission Neutron Spectra of Actinides

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Coordinated Research Projects (CRP)

CRPs - Technical reports	2009	2010	2011	2012	2013	(6) 2014	(6) 2015	(6) 2016	(6) 2017	(5) 2018
Technical report (Capote Noy): *Nuclear Data Sheets* **131** (2016) 1-106 **Prompt fission neutron spectra of actinides**	■	■	■	■	■	■	■			
Technical report (Dimitriou) **Development of a reference database of Particle-Induced Gamma-ray Emission Spectroscopy (PIGE)**			■	■	■	■	■			
Technical report (Capote Noy) **Nuclear data for charged-particle monitor reactions and Medical isotope production**				■	■	■	■	■	■	
Technical report (Dimitriou) **Reference Database for beta-delayed Neutron Emission**					■	■	■	■	■	■
Technical report (Simakov/Trkov) **Testing and improving the International Reactor Dosimetry and Fusion File (IRDFF)**					■	■	■	■	■	■
Technical report (Simakov/Koning) **Primary radiation damage cross sections**					■	■	■	■	■	■
Technical Report (Capote Noy) **RIPL for fission cross section calculations**								■	■	■
Technical Report (Dimitriou) **Updating the photonuclear data library and generating a reference database for photon strength functions**								■	■	■

Coordinated Research Projects (CRPs) - an IAEA tool to produce outputs by encouraging collaboration between various parties

New CRP's are discussed
at our biannual INDC meeting (next: June 27-30 2016)

Beta-delayed neutron emission evaluation (2013-2017) P. Dimitriou

- Beta-delayed neutrons are important for energy production, astrophysics and nuclear theory
- 2nd RCM held 23-27 March 2015 in Vienna
- INDC(NDS)-0683, summary report in preparation

Validation of the International Dosimetry Library (IRDFF) (2013-2017) Simakov-Capote

- A new version of dosimetry library for fission and fusion applications (IRDFF v1.05) released in October 2014
- 2nd RCM held 16-20 March 2015 in Vienna
- INDC(NDS)-0682, summary report in preparation
- See https://www-nds.iaea.org/IRDFF/ for details

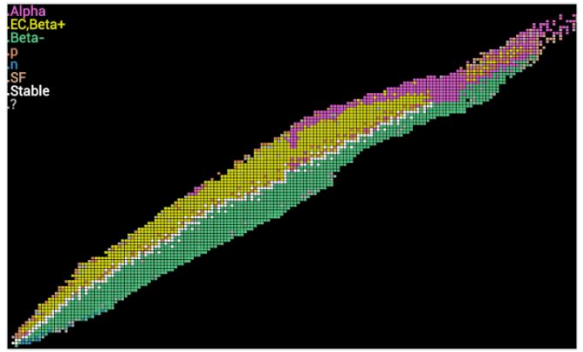
Primary Radiation Damage Cross Sections (2013-2017) Simakov-Forrest-Koning

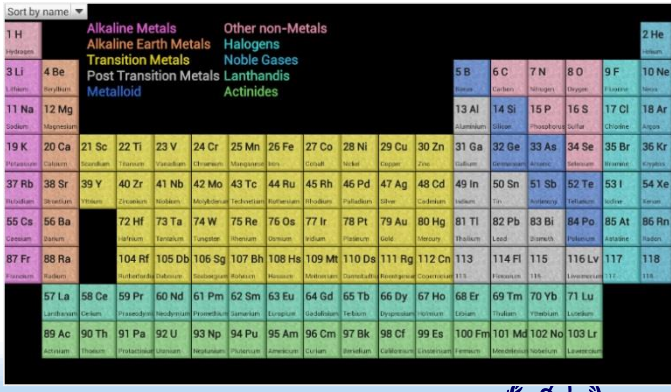
- **Bring together Nuclear Data and Materials Experts**
  - **to revisit NRT-dpa standard and to implement an upgraded one and improve gas production cross sections**
- **2nd RCM to held 29 June - 2 July 2015**
- **See https://www-nds.iaea.org/CRPdpa/ for details**

Training

- **Provide outreach in the form of training, especially to developing countries**
- **Workshops held at ICTP Trieste (3 in 2015)**
  - **Modern Methods in Plasma Spectroscopy, A+M (*March*)**
  - **Nuclear Data for Neutron Dosimetry and Analytical Methods by Applying Research Reactors (*April*)**
  - **Nuclear Data Measurements for Science and Applications in collaboration with n_TOF/CERN (October)**

Isotope Browser – App for smart phones





- Interactive App for Tablet or phone
- Provides nuclide properties for 4,000 nuclides and isomers (data from ENSDF)
- Android version - Jul. 2013
- Apple version - Dec. 2014
- ~20,000 downloads so far (~1,200 x month)
- 2 new releases per year
  - *https://play.google.com/store/apps*
  - *https://itunes.apple.com*

Highlights for 2016

- Increased participation in the “Collaborative International Evaluated Library” (CIELO) project (NEA)
  - Improve evaluated data for ^{1}H, ^{16}O, ^{56}Fe, $^{235,238}U$ and ^{239}Pu
  - Set up a CIELO network to continue this effort for more targets subject to availability of resources
- Neutron Standards: a DDP project for updated Standards
- Running CRPS:
  - Medical isotope production
  - Atomic + Molecular data CRP’s for fusion (steels, tritium, tungsten)
- New CRPs
  - Reference Input Parameter Library (**RIPL**) for fission
  - Updating the Photonuclear Data Library and generating a database for Photon Strength Functions

Thank you!