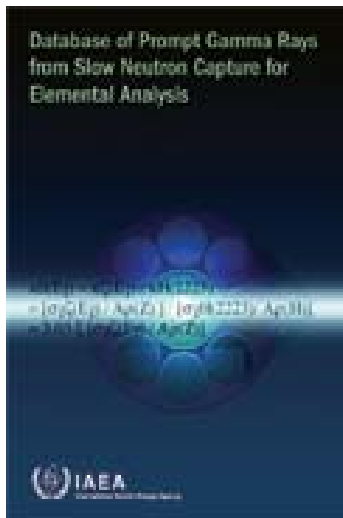


EGAF Status Report

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Database of Prompt Gamma Rays from Slow Neutron Capture for Elemental Analysis Neutron-capture prompt-gamma activation analysis (PGAA) is particularly valuable as a non-destructive nuclear method in the measurement of elements that do not form neutron capture products with delayed gamma ray emissions. Inaccurate and incomplete data have been a significant hindrance in the qualitative and quantitative analysis of complicated capture gamma spectra by means of PGAA. This database was produced to improve the quality and quantity of required data in order to make possible the reliable application of PGAA in fields such as materials science, geology, mining, archaeology, environment, food analysis and medicine. The database provides a variety of tables for all natural elements (from H to U) including the following data: isotopic composition, thermal radiative cross-section (total and partial), Westcott g-factors, energy of the gamma rays (prompt and delayed), decay mode, half-life and branching ratios. The CD-ROM included in this publication contains the database, the retrieval system and important electronic documents related to the project. STI/PUB/1263, 251 pp.; 14 figures; 2007, ISBN 92-0-101306-X, English. 70.00 Euro. Date of Issue: 2007-03-16. [Full Text](#), (File Size: 13698 KB). Subject Classification: 0304 - Nuclear analytical techniques; 0306 - Nuclear data.

Access to IAEA/LBNL EGAF Database

IAEA EGAF Homepage: <http://www-nds.iaea.org/pgaa/>

- IAEA PGAA Database viewer

<http://www-nds.iaea.org/pgaa/pgaa7/index.html>

- PGAA Database files

<http://www-nds.iaea.org/pgaa/databases.htm>

- Documentation

http://www-pub.iaea.org/MTCD/publications/PDF/Pub1263_web.pdf

LBNL EGAF Homepage: <http://ie.lbl.gov/ng.html>

Experiments/Evaluations in Progress

Z=3-9: evaluation to be completed in 2012.

²³**Na**, ^{24,25,26}**Mg**: evaluation completed. Manuscript in preparation.

²⁷**Al**, ^{28,29,30}**Si**, ³¹**P**, ^{32,33,34,36}**S**, ^{35,37}**Cl**: evaluation to be completed in 2012.

^{39,40,41}**K**: evaluation completed. Manuscript to be submitted to PRC 12/2011.

^{54,56,57,58}**Fe**: evaluation in progress.

⁸⁹**Y**: evaluation in progress.

^{151,153}**Eu**: evaluation to be completed in 2012.

^{154,155,156,157,158}**Gd**: evaluation to be completed in 2012.

^{182,183,184,186}**W**: evaluation to be completed in 2012.

Experiments/Evaluations Planned 2012

^2H , ^3He : measurement planned at Garching Reactor.

$^{90,91,92,94,96}\text{Zr}$: measurement planned at Garching Reactor.

^{180}W , **Noble gases**: measurements planned at Budapest Reactor.

^{127}I : evaluation planned in 2012.

^{159}Tb : evaluation planned in 2012.

^{165}Ho : evaluation planned in 2012.

^{238}U : evaluation planned in 2012.

Determination of primary γ -ray B(XL)W from thermal (n, γ) data

Primary γ -ray partial half-lives are given by

$$t_{1/2}(\gamma) = \ln(2) \frac{\sigma_0}{\sigma_\gamma} \hbar \langle \Gamma_{\gamma^0} \rangle$$

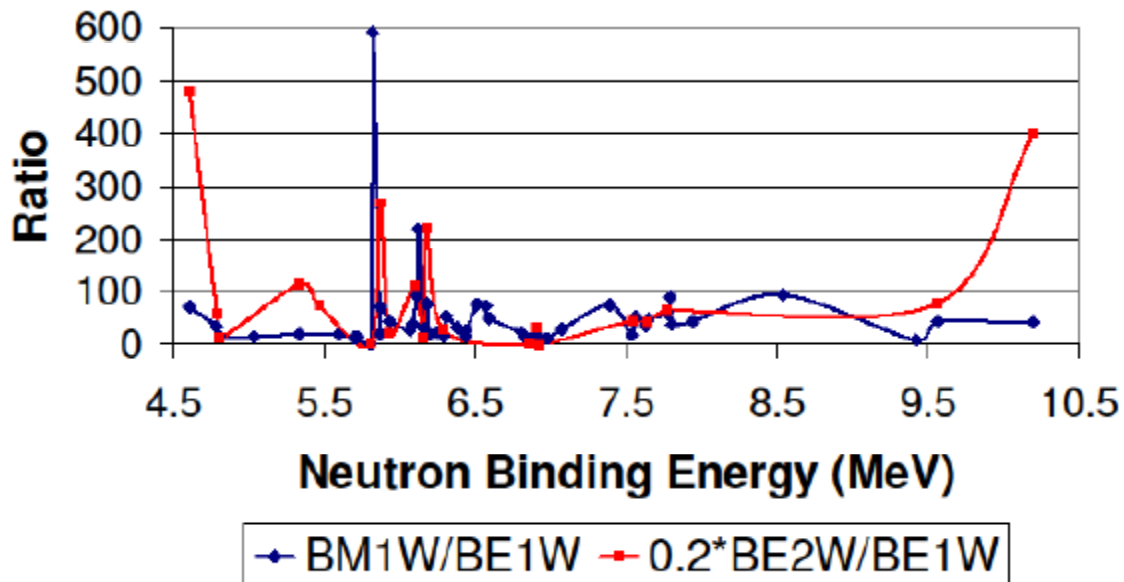
σ_γ = primary γ -ray cross section (EGAF)

σ_0 = total radiative cross section (*Atlas of Neutron Resonances*)

$\langle \Gamma_{\gamma^0} \rangle$ = total γ -ray width (*Atlas of Neutron Resonances*) is nearly constant for all resonances near the neutron separation energy.

B(XL)W Systematics

Variation in BM1W/BE1W,
BE2W/BE1W with S_n



	E_N (ARC) MeV	$\delta = E2/M1$
^{106}Pd	1	1.15
^{106}Pd	2	1.50
^{155}Gd	2	0.90
^{156}Gd	1	0.86
^{156}Gd	2	0.84
^{157}Gd	1	1.13
^{159}Gd	2	1.32
^{164}Dy	2	0.72
^{168}Er	2	0.57
^{198}Au	2	1.11
^{233}Th	0	1.18
^{233}Th	2	1.02
^{239}U	2	0.89
Ave.		1.02

Nuclear structure effects as a function of S_n (thermal n)

E2/M1 mixing ratio (ARC)

EGAF Publications Plans

1. Publish EGAF σ_0 evaluations in refereed journal
2. Compile complete ENSDF format publication for NDS
 - a. Adopted RIPL file
 - b. Compilation of σ_0 values
 - c. (n, γ) dataset containing
 - i. σ_γ values
 - ii. Normalization per 100 neutron captures
 - iii. B(XL)W values for primary γ -rays
3. Activation datasets (to be submitted to DDEP)
4. First publication by Nuclear Data Week 2012

COMPLAINTS
COMMENTS
COMPLIMENTS

