LANL Report

T. Kawano, M.B. Chadwick, G.M. Hale, P. Talou, P.G. Young, S. Holloway Theoretical Division, Los Alamos National Laboratory



UNCLASSIFIED

Slide 1



Light Element R-Matrix Analysis

■³H

• fix (n,2n) cross section completed (to be sent to BNL)

■⁶Li

- new evaluation completed
- what about $(n,n'\alpha d)$ break-up format?
 - can be processed by NJOY
 - pseudo-level format is awkward

■⁹Be

- analysis performed by adding new RPI data
- benchmark testing underway

■¹⁶O

- several new evaluations made to be decided
- total cross section change small, near the first resonance
- some new measurements of (n, α) and (α, n) higher than ENDF/B-VII.0



UNCLASSIFIED



Be-9 Total Cross Section





Elements in Medium Mass Range

Ti isotopes

- issues remain
 - new resonance parameter covariances from ORNL
 - γ -production for some isotopes (⁴⁷Ti fixed by LLNL)

•V

- postponed
- ■⁵⁸Ni(n, α),⁵⁶Fe(n, α)
 - work in progress (Holloway, Kawano), not yet completed
- ^{63,65}Cu
 - Mosteller tested new CENDL-3 data
 - benchmark testing not so satisfactory (See Kahler's talk)
 - new evaluations by Shibata being tested



• capture data problem - too low at low energies ?

UNCLASSIFIED



Y-89 Capture Cross Section in Resonance Range





Y-89 Capture 70 Group Cross Section



Change the upper limit to 30keV or so, or

Increase the radiative width to match the Hauser-Feshbach calculation

UNCLASSIFIED

Slide 6



lamos



Fe-56 Alpha-Particle Production Cross Section





Ni-58 Alpha-Production Cross Section



Preliminary

Operated by Los Alamos National Security, LLC for the U.S. Department of Energy's NNSA



Actinides

- ²³³U
- delayed neutron typo, E-02 -> E-03, confirmed
- ²³⁶U ²⁴¹Am
 - small adjustment of fission cross sections in the sub-threshold region
 - capture calculated for better production of integral data

²⁴⁰Pu

- adopt LANL new evaluation
 - · comparison of resonance region reported by R. Cullen
 - P. Young and O. Bouland will review this again

²³⁷U

- adopt LLNL new evaluation
- ²³⁷Np
 - (n,2n) new evaluation by Holloway underway, taking account of isomeric state production cross section
- ²³⁶Np ²³⁸Np
 - evaluations in JENDL/AC reviewed (Holloway, Chadwick), adopt?
- ²⁴³Am
 - likely no change
 ²³⁸DII

nos • plan

UNCLASSIFIED





U-236 and Am-241 Capture Cross Section



Increase capture cross sections slightly for better reproduction of critical assembly data (See Kahler's talk) M. Jandel et al. Phys. Rev. C, 78 034609 (2008)



UNCLASSIFIED

Slide 10



Pu-240 LANL Evaluation - Total and Capture





Pu-240 LANL Evaluation, Fission



Operated by Los Alamos National Security, LLC for the U.S. Department of Energy's NNSA





Pu-240 Resonance Region





Np-237



Operated by Los Alamos National Security, LLC for the U.S. Department of Energy's NNSA

NNSX

Other Problems Reported

- Interpolation problem in Prompt Fission Spectra
 - transport simulation needs finer energy grid for outgoing neutron
 - MacFarlane generated log-interpolated table
 - will be stored in the evaluations soon
- Missing Photon Production data
 - many gamma-ray lines data were dropped
 - ¹H, ²⁷Al, Ca, S, K, Ti (talk by White 2008)
 - no action made



UNCLASSIFIED

