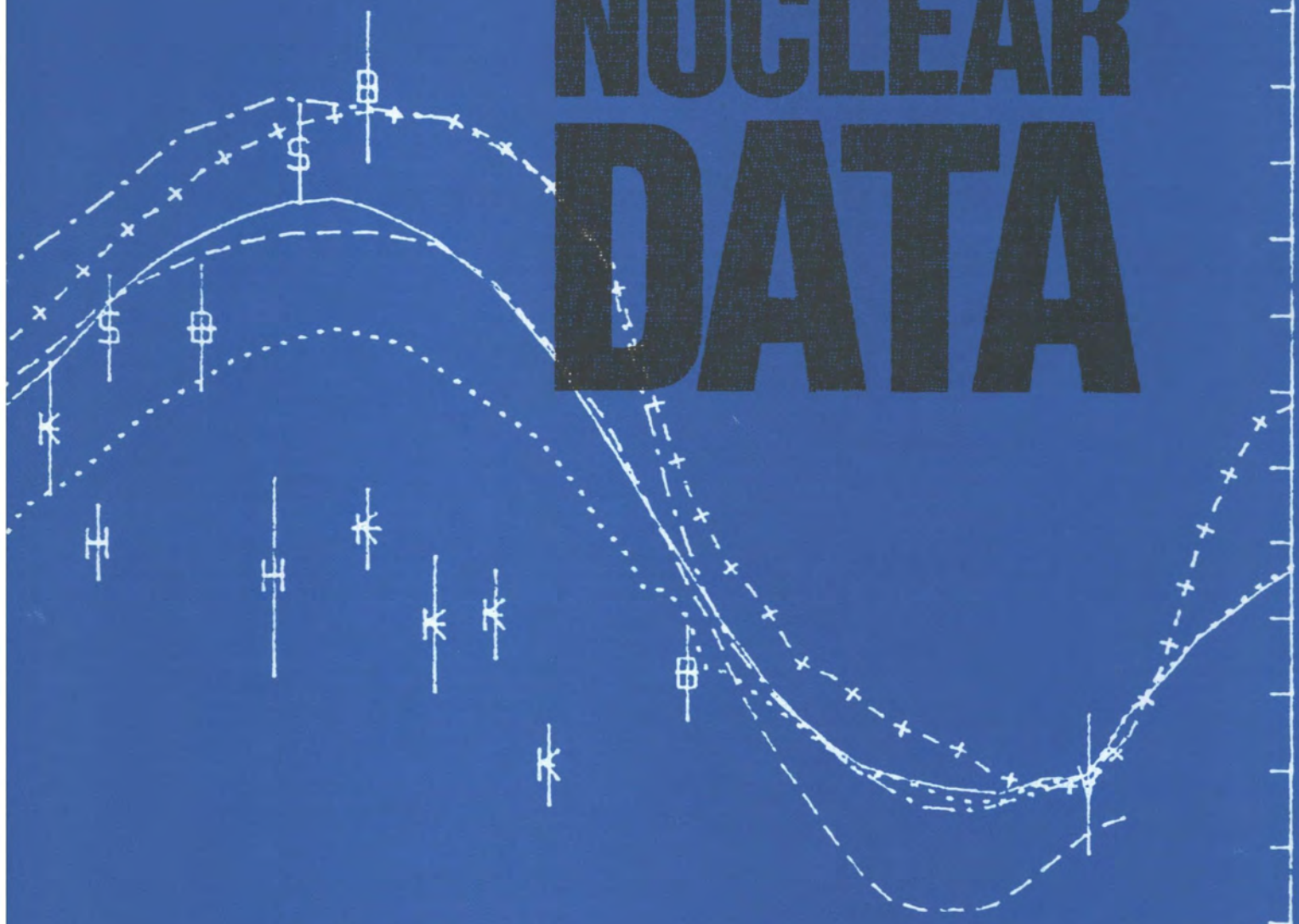
KDK-75, Part B
NEANDC (OR) 159 A/U
INDC (SWD) 21/G

PART B

COMPILATION OF ACTINIDE NEUTRON NUCLEAR DATA



SWEDISH NUCLEAR DATA COMMITTEE · STOCKHOLM 1986

KDK-75, Part B
NEANDC(OR) 159/A,U
INDC(SWD) 21/G

COMPILATION OF ACTINIDE NEUTRON NUCLEAR DATA

PART B: EVALUATED GROUP CROSS SECTIONS

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Swedish Nuclear Data Committee
Stockholm
1985

CONTENTS

1. INTRODUCTION

The Swedish Nuclear Data Committee has initiated a compilation of a selected set of neutron cross section data for the most important actinide isotopes. The compilation work has been done by a working group sponsored by the Swedish Nuclear Power Inspectorate. The main part of the data information has been obtained from the OECD/NEA Data Bank at Saclay, France.

The aim of the report is to present available neutron cross section data in a comprehensible way to allow a comparison between different evaluated libraries and to judge about the reliability of these libraries from the experimental data.

The first result of the compilation was reported in 1979 (1). Since that time the compilation has been updated and further isotopes have been added. It now consists of 24 isotopes ranging from ^{232}Th to ^{252}Cf (KDK-75, Part A). Furthermore, in place of the resonance integrals reported in KDK-35 the compilation now includes group cross sections of the main evaluated data files for each of the 24 isotopes (KDK-75, Part B).

Part A of the compilation consists of experimental and evaluated neutron cross section data in the neutron energy regions from 10^{-4} to 1 eV and from 10 keV to 20 MeV. The reported data are the total, capture and fission cross sections for ^{232}Th, ^{233,235,238}U, ^{237}Np, $^{239-242}$Pu, $^{241-243}$Am, $^{242-248}$Cm, ^{249}Bk, $^{249-252}$Cf, furthermore the elastic cross sections for ^{235,238}U and ^{239}Pu, the neutron inelastic and (n,2n) cross sections for ^{238}U and the $\bar{\nu}$-values of ^{232}Th, ^{233,235,238}U and ^{239}Pu. Evaluated data are from the last available versions of the main libraries i.e. versions IV and V of the U.S. Evaluated Neutron Data File part B (ENDF/B), the 1982 version of the Lawrence Livermore Laboratory Evaluated Neutron Data Library (ENDL), the 1981 version of the U.K. Neutron Data Library (UKNDL), the version 4 of Karlsruhe Evaluated Data File (KEDAK) and version 2 of the Japanese Evaluated Data Library (JENDL). Furthermore, recent versions of $^{239-242}$Pu evaluations from A.V.Lykov Institute of Thermal and Mass Exchange Byelorussian SSR Academy of Sciences, Minsk, USSR (ITMO) and a ^{232}Th evaluation from the IAEA/NDS International Neutron Data Library (INDL) are also given.

The experimental data are taken from the "International Library of Nuclear Experimental Information" (EXFOR) and from recent publications. A representative subset of the most recent information is included.

The data information is stored in a computer by which drawings could be made of selected subsets of the information in an interactive manner. In preparing the figures in the report a compromise had often to be done between the magnification necessary to avoid too much overlap between different data sets and the number of pages that could be accepted.

Part B of the compilation gives the total, elastic, capture and fission group cross sections for the same isotopes as in Part A. The CSEWG 239 group structure (2) was chosen which gives a reasonable detailed information for a comparison of different data libraries. The flat weighted cross sections averaged over the group structure from any evaluated file format was calculated with the program HENRI (3). A computerized plotting of the group cross sections was made by Studsvik Data, Studsvik Energiteknik AB.

The authors wish to acknowledge L. Björklund, FOA, G. Olsson, Studsvik Data and M-Ch Malmström for helping with the computer plottings and Ch. Spolén for typing the manuscript.

References

1. Compilation of Actinide Neutron Nuclear Data, Swedish Nuclear Data Committee Report, KDK-35 (NEANDC(OR) 153/L, INDC(SWD) 13L, SKI B32/78), 1979

2. Specification of a Generally Useful Multigroup Structure for Neutron Transport, Los Alamos Scientific Laboratory Report LA-5277-MS

3. Nordborg C., HENRI - a computer program for calculation of average cross sections in the resonance region of evaluated files. (Not published)

2.1 LIST OF EVALUATED AND EXPERIMENTAL DATA LIBRARIES

ENDF/B: Evaluated Nuclear Data File, Version B, National Neutron Cross Section Center, Brookhaven National Laboratory, Upton, New York 11973

UKNDL: United Kingdom Atomic Energy Authority Nuclear Data Library

ENDL: Lawrence Livermore Laboratory Evaluated Nuclear Data Library, Lawrence Livermore Laboratory, University of California, Livermore, California 94550

KEDAK: Karlsruhe Evaluated Nuclear Data Library, Kernforschungszentrum Karlsruhe, Karlsruhe, Germany

JENDL: Japanense Evaluated Neutron Data Library, Japan Atomic Energy Research Institute, Tokai-Mura, Naka-Gun, Ibaraki-Ken, Japan

ITMO: A.V. Lykov Institute of Thermal and Mass Exchange Byeolorussian SSR Academy of Sciences, Minsk, USSR

INDL/A: International Nuclear Data Library for the Actinides, Nuclear Data Section, IAEA, Vienna

EXFOR: Computerized system of codes and formats used for the exchange of experimental neutron nuclear data between the Four Neutron Data Centres

BNL 325: Neutron Cross Sections, Vol 1, Neutron Resonance Parameters and Thermal Cross Sections, Part B: Z = 61-100, S.F. Mughabghab, NNDC, Academic Press 1984

NNDC (1983) J.R. Stehn, M. Divadeenam, N.E. Holden, Eval. of the Thermal Neutron Constants for ^{233}U, ^{235}U, ^{239}Pu and ^{241}Pu. Proc. Conf. on Nuclear Data for Science and Technology, Antwerp, 6-10 Sept. 1982. Revised values presented at the IAEA Consultants' Meeting on "The U-235 fast-neutron fission cross section", Smolenice, 28-29 March, 1983

84 NPL AXTON E.J. Axton, Eval. of the thermal neutron constants of ^{233}U, ^{235}U, ^{239}Pu and ^{241}Pu, European Applied Research Report, EARF 5, No 4 (1984) 609

2.2 QUANTITY DEFINITIONS

Quantity	Definition
σ_t, σ_{tot}	Total neutron cross section
σ_f, σ_{fiss}, σ_{nf}	Neutron induced fission cross section
σ_γ, σ_{ng}	Radiative capture cross section
$\sigma_{n,n}$, σ_{el}	Total neutron elastic scattering cross section
$\sigma_{n,n'}$	Total neutron inelastic scattering cross section
$\sigma_{n,2n}$	Cross section for neutron induced reactions resulting in the emission of two neutrons
σ^{th}	Cross section for thermal neutrons
RI	Resonance integral (RI_γ = RI for capture, RI_f = RI for fission)
$\bar{\nu}$	Average number of neutrons emitted per fission ($\bar{\nu}_p$ = number of prompt neutrons, $\bar{\nu}_d$ = number of delayed neutrons, $\bar{\nu}^{sp} = \bar{\nu}$ for spontaneous fission, $\bar{\nu}_+$ = total number of neutrons emitted per fission = $\bar{\nu}_p + \bar{\nu}_d$)
$T_{1/2}$	Half life
Q_α	Alpha disintegration energy

$^{232}_{90}Th$

Natural isotopic abundance 100 %

^{232}Th

NUCLEAR PROPERTIES

Spin and parity of ground state: 0^+

Ground state decay:

Alpha to ^{228}Ra: 100%, Q_α = 4.082 MeV

Half-life: $1.405 \cdot 10^{10}$ yr

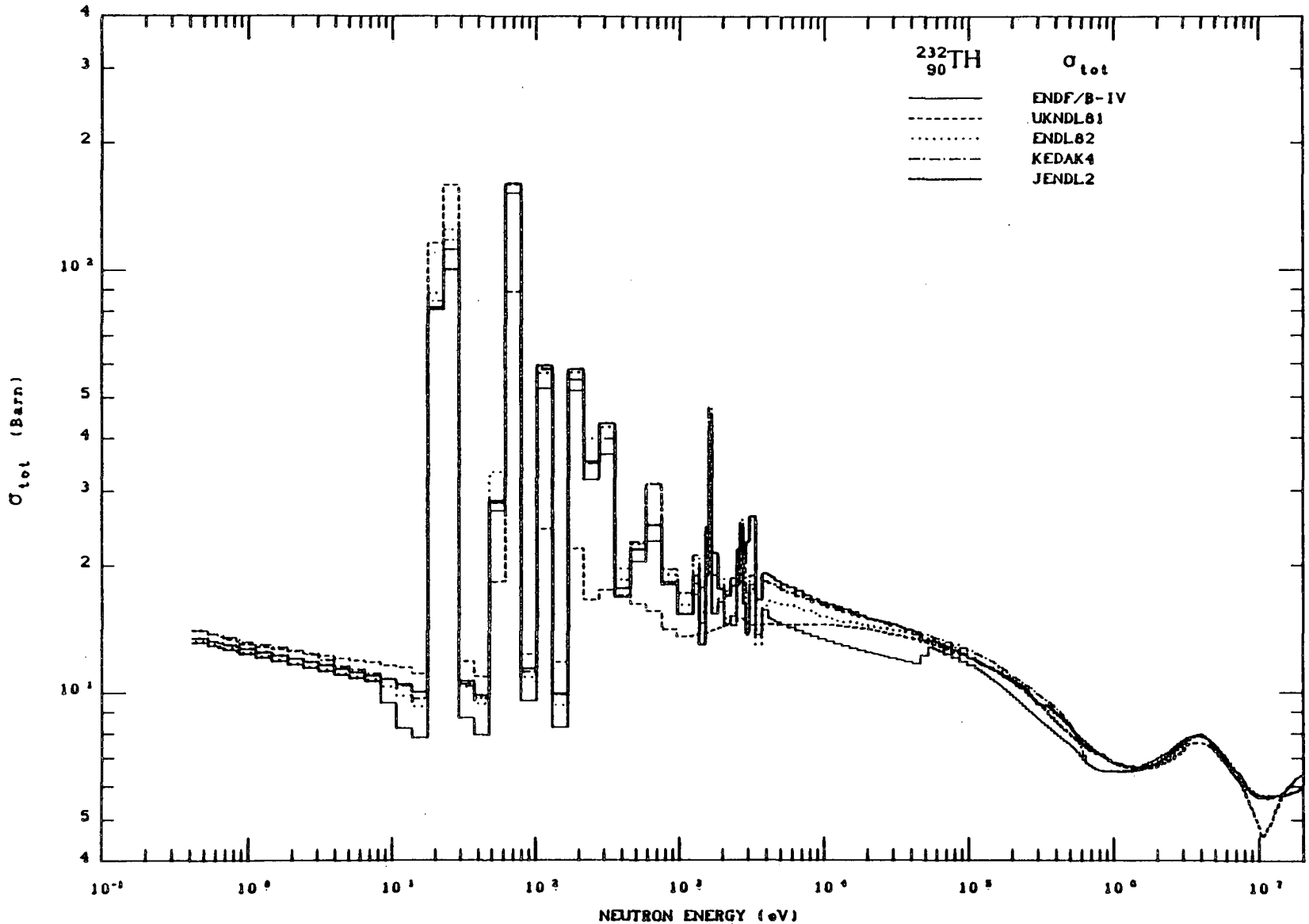
10^{21} yr - spontaneous fission

THERMAL CROSS SECTIONS (2200 m/s)

Reference	σ_γ	σ_t	(barns)
ENDF/B - IV	7.41	19.2	
ENDF/B - V	7.405	20.36	
UKNDL - 81	7.400	19.62	
ENDL - 82	7.433	19.34	
KEDAK - 4	7.406	20.34	
JENDL - 2	7.262	19.60	
BNL 325 (1984)	7.37	20.14	

RESONANCE INTEGRALS

Reference	RI_γ	RI_f	(barns)
ENDF/B - IV	83.6		
ENDF/B - V	83.96	0.6185	
UKNDL - 81	110.8	0.5133	
ENDL - 82	93.87	0.6432	
KEDAK - 4	82.99	0.5928	
JENDL - 2	79.93	0.6362	
BNL 325 (1984)	85		
73 MUN, ALIAN	86		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σ_{tot}
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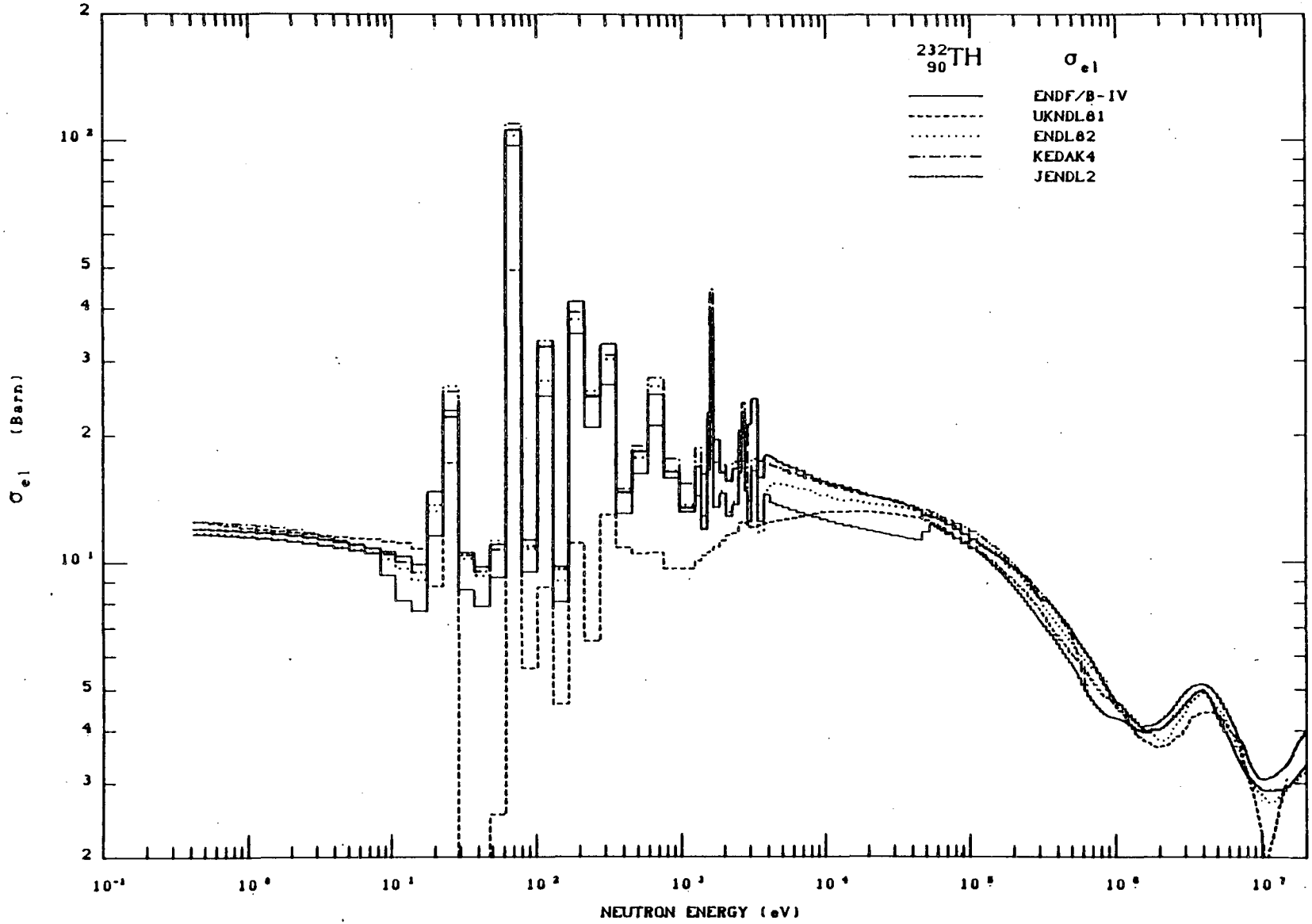
ENDL82
KEDAK4
JENDL2
σ_{tot} (Barn)
NEUTRON ENERGY (eV)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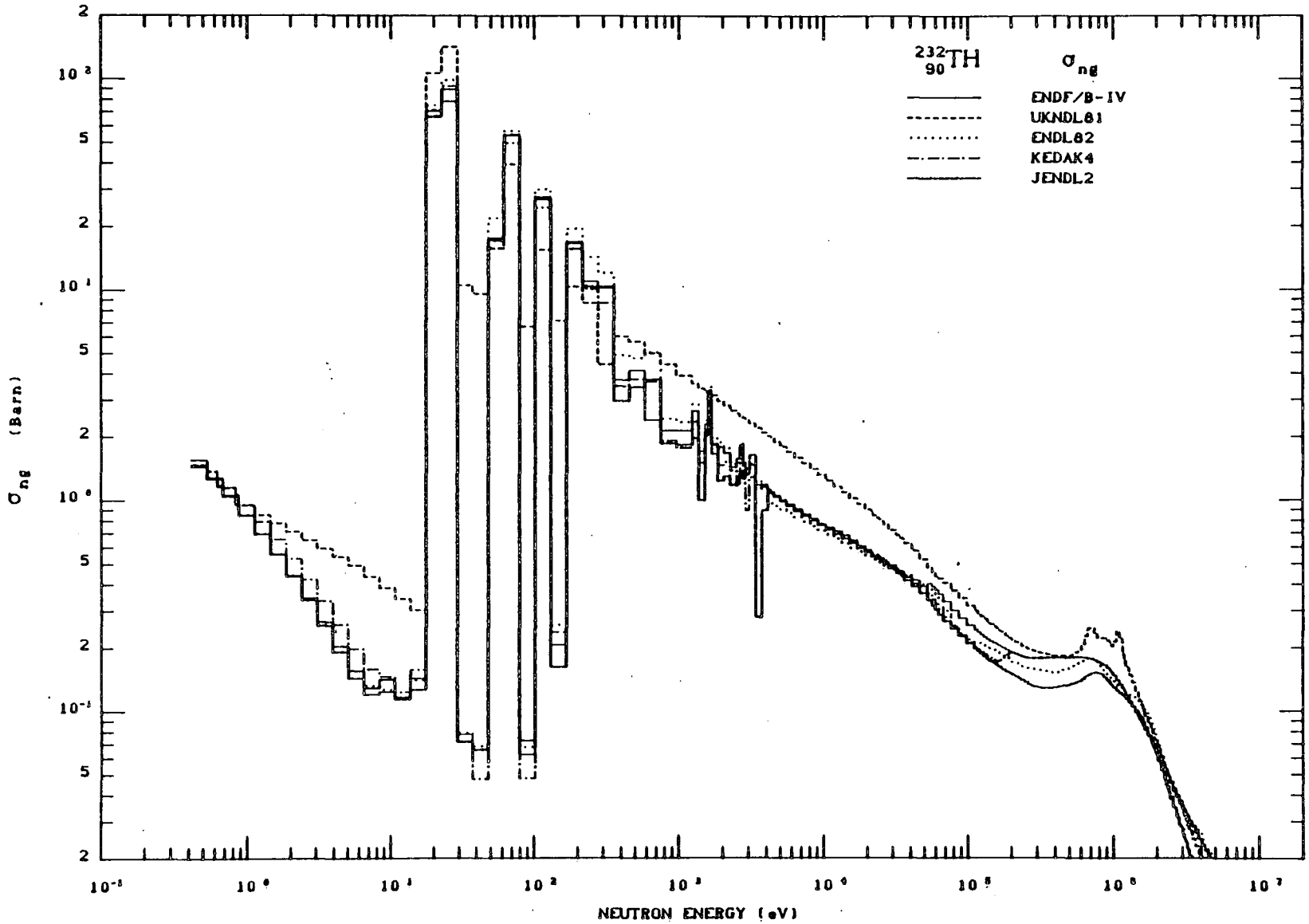
JENDL2
σ_{el} (Barn)
NEUTRON ENERGY (eV)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KEDAK4
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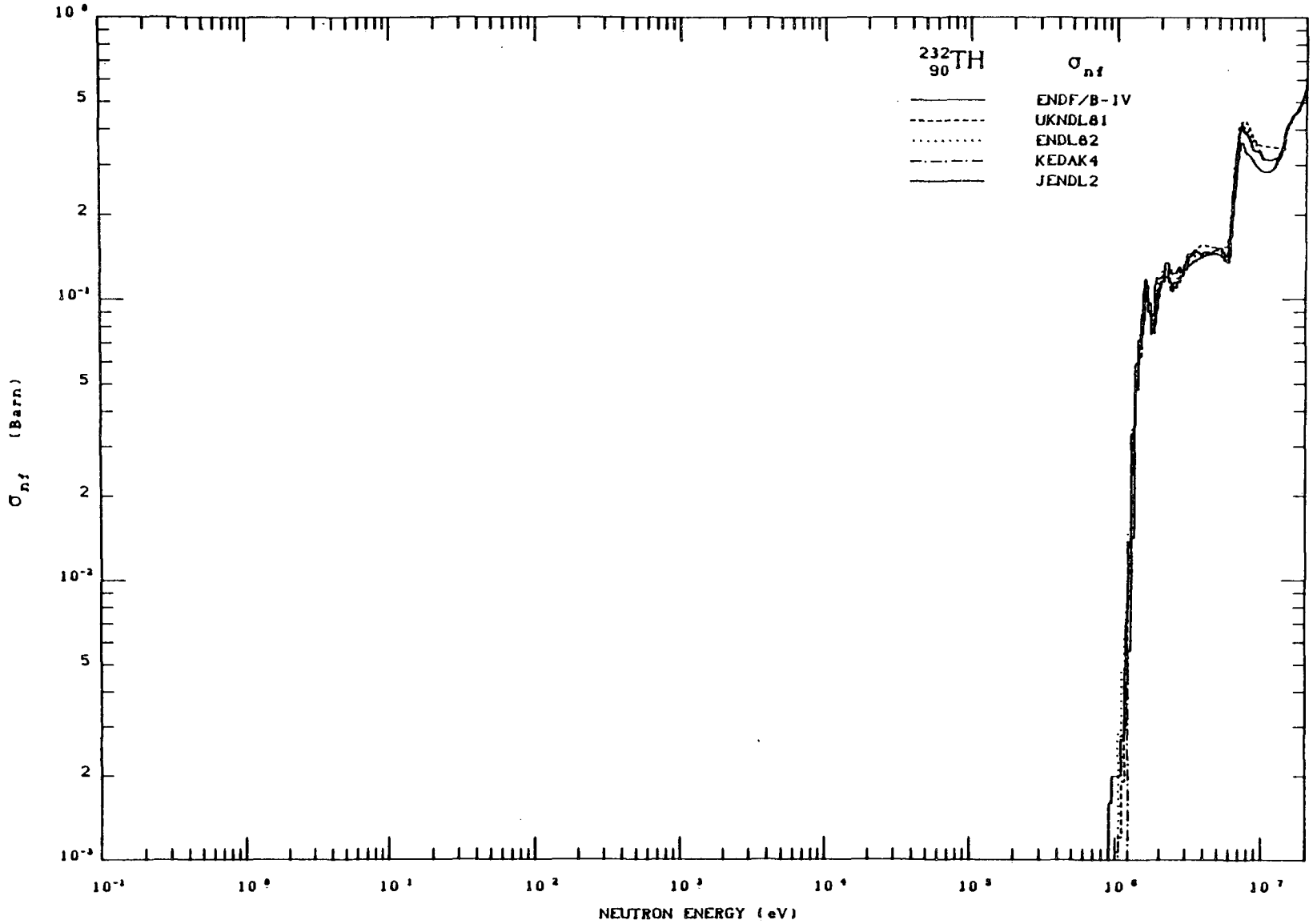
σ_{ng} (Barn)
NEUTRON ENERGY (eV)


$^{232}_{90}$TH
σ_{nf}
ENDF/B-IV
UKNDL81
ENDL82
KEDAK4
JENDL2
σ_{nf} (Barn)
NEUTRON ENERGY (eV)

$^{232}_{90}$Th

^{233}U

NUCLEAR PROPERTIES

Spin and parity of ground state: $5/2^+$

Ground state decay:

Alpha to ^{229}Th: 100%, $Q_\alpha = 4.909$

Half life: $1.592 \cdot 10^5$ yr

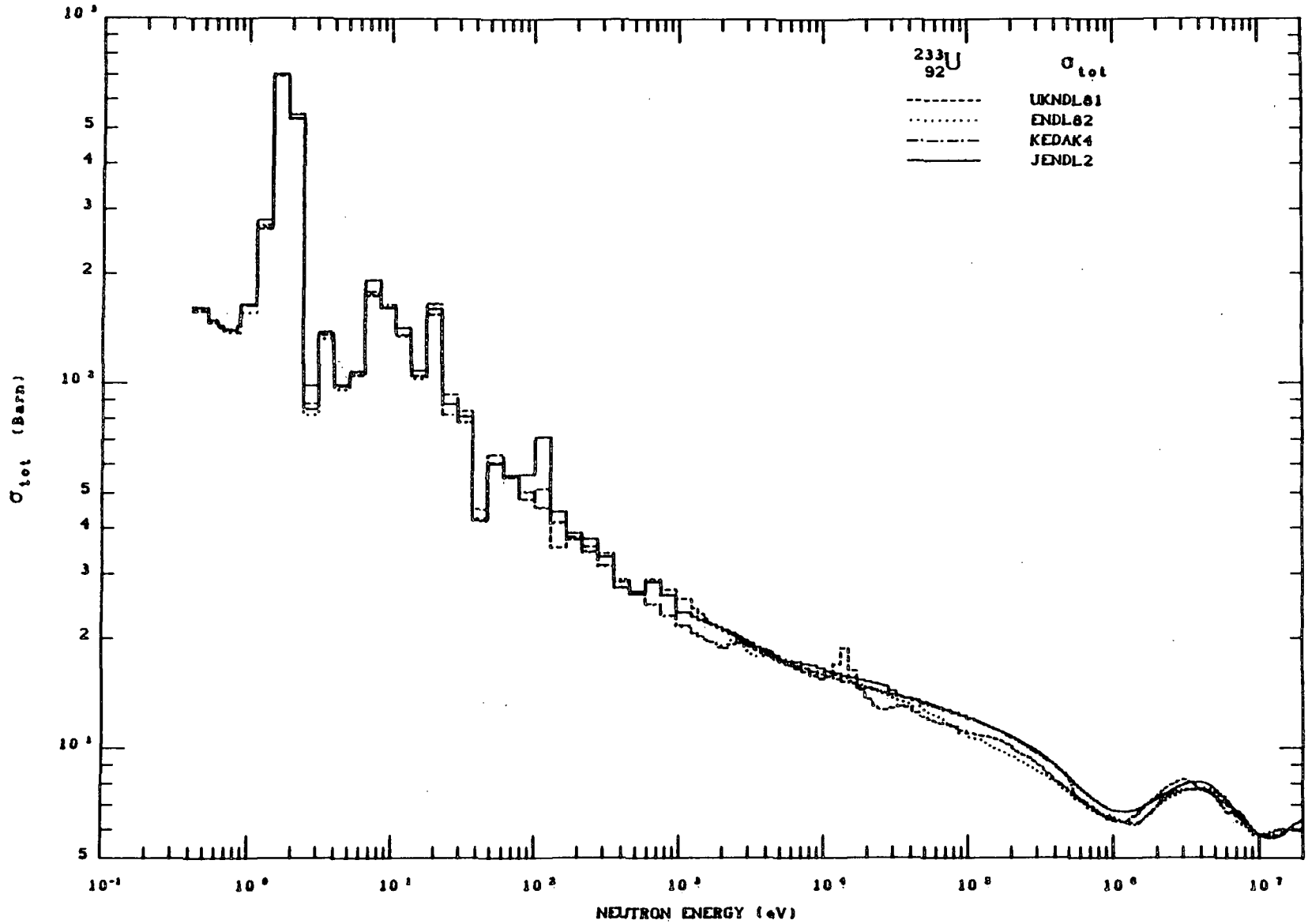
$1.200 \cdot 10^{17}$ yr spontaneous fission

THERMAL CROSS SECTIONS (2200 m/s)

Reference	σ_γ	σ_f	σ_t	$\bar{\nu}_+$	(barns)
ENDF/B - IV	45.8	524.3		2.498	
ENDF/B - V	45.79	528.7	587.2	2.495	
UKNDL -81	48.60	528.0	588.5		
ENDL -82	45.90	525.1	585.5		
KEDAK-4	46.39	526.6	588.5		
JENDL-2	45.30	529.8	587.8		
71 KAP,CABELL	48.3				
BNL 325 (1984)	45.5	529.1	587.5	2.493	
NNDC (1983)	45.3	530.9		2.491	
84 NPL,AXTON	42.2	531.9		2.488	

RESONANCE INTEGRALS

Reference	RI_γ	RI_f	(barns)
ENDF/B - IV	142.2	702.9	
ENDF/B - V	136.6	756.0	
UKNDL -81	145.7	756.9	
ENDL -82	133.9	754.8	
KEDAK-4	134.9	764.3	
JENDL-2	138.6	771.4	
BNL 325 (1984)	137	760	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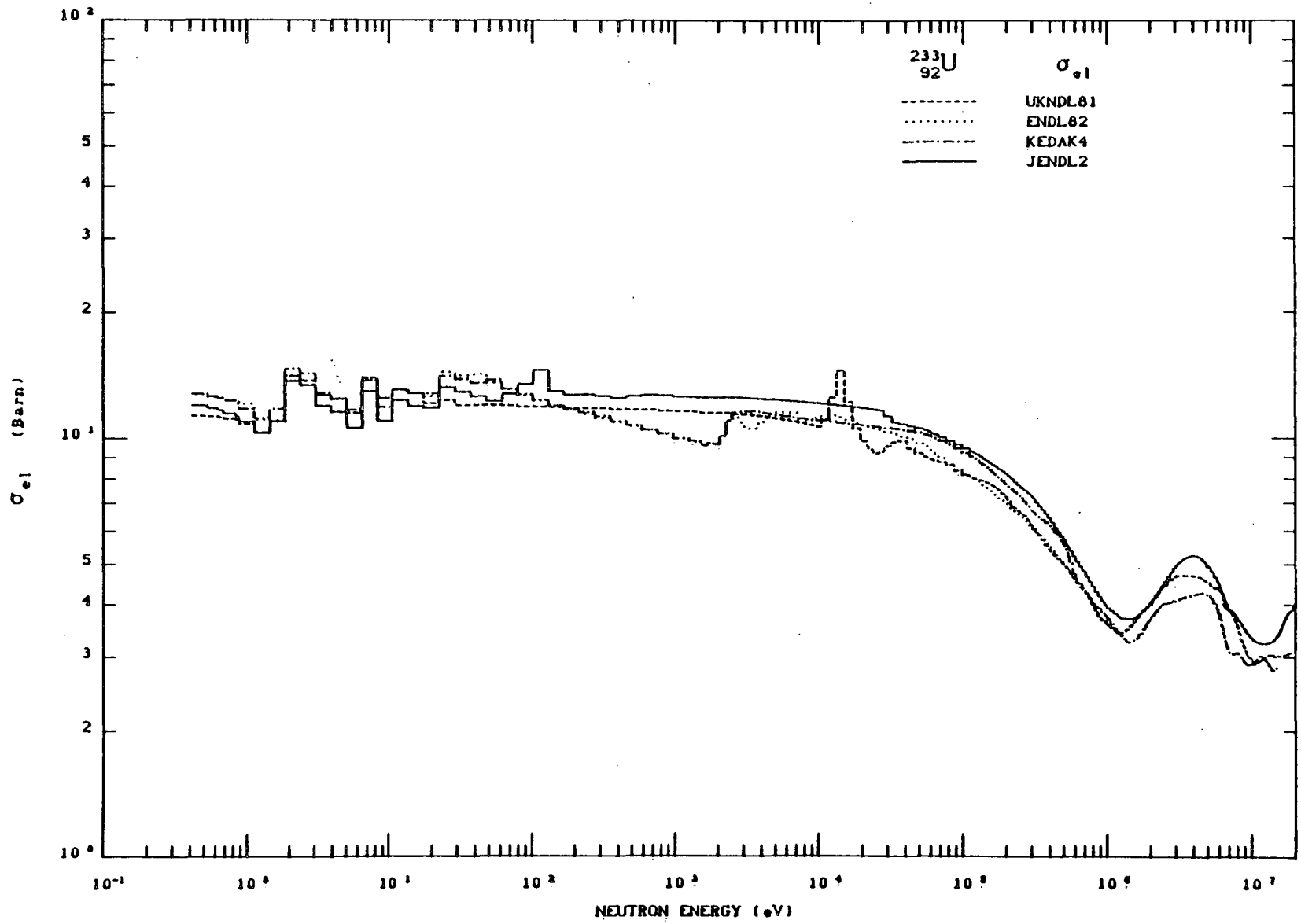
σ_{tot}
UKNDL81
ENDL82
KEDAK4
JENDL2
σ_{tot} (Barn)
NEUTRON ENERGY (eV)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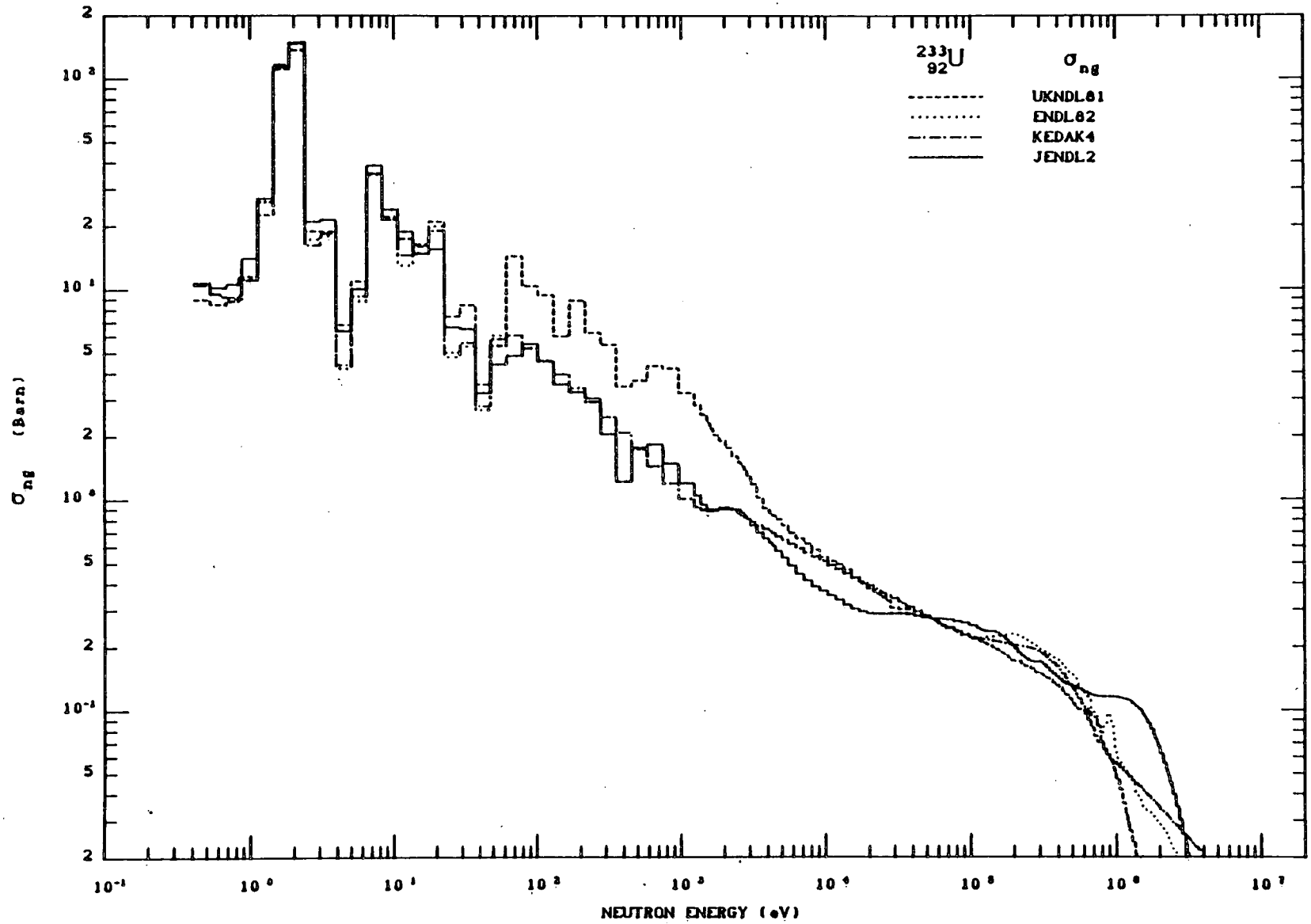
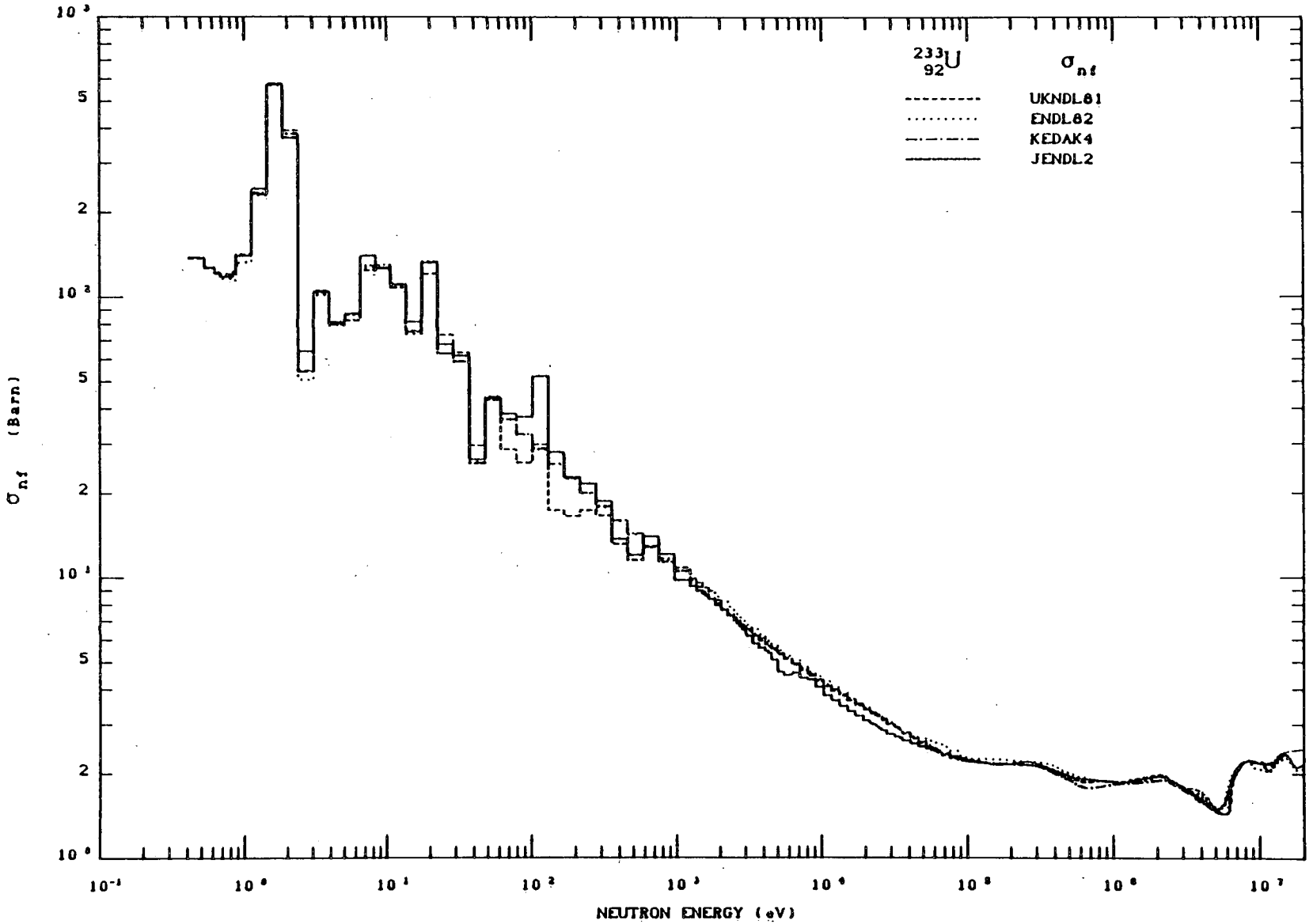
σ_{el}
UKNDL81
ENDL82
KEDAK4
JENDL2
σ_{el} (Barn)
NEUTRON ENERGY (eV)


233 92 U
σng
UKNDL81
ENDL82
KEDAK4
JENDL2
σng (Barn)
NEUTRON ENERGY (eV)


$^{233}_{92}U$
σ_{nf}
UKNDL81
ENDL82
KEDAK4
JENDL2
σ_{nf} (Barn)
NEUTRON ENERGY (eV)

^{235}U

NUCLEAR PROPERTIES

Spin and parity of ground state: $7/2^-$

Ground state decay:

Alpha to ^{231}Th: 100%, $Q_\alpha = 4.679$

Half life: $7.038 \cdot 10^8$ yr

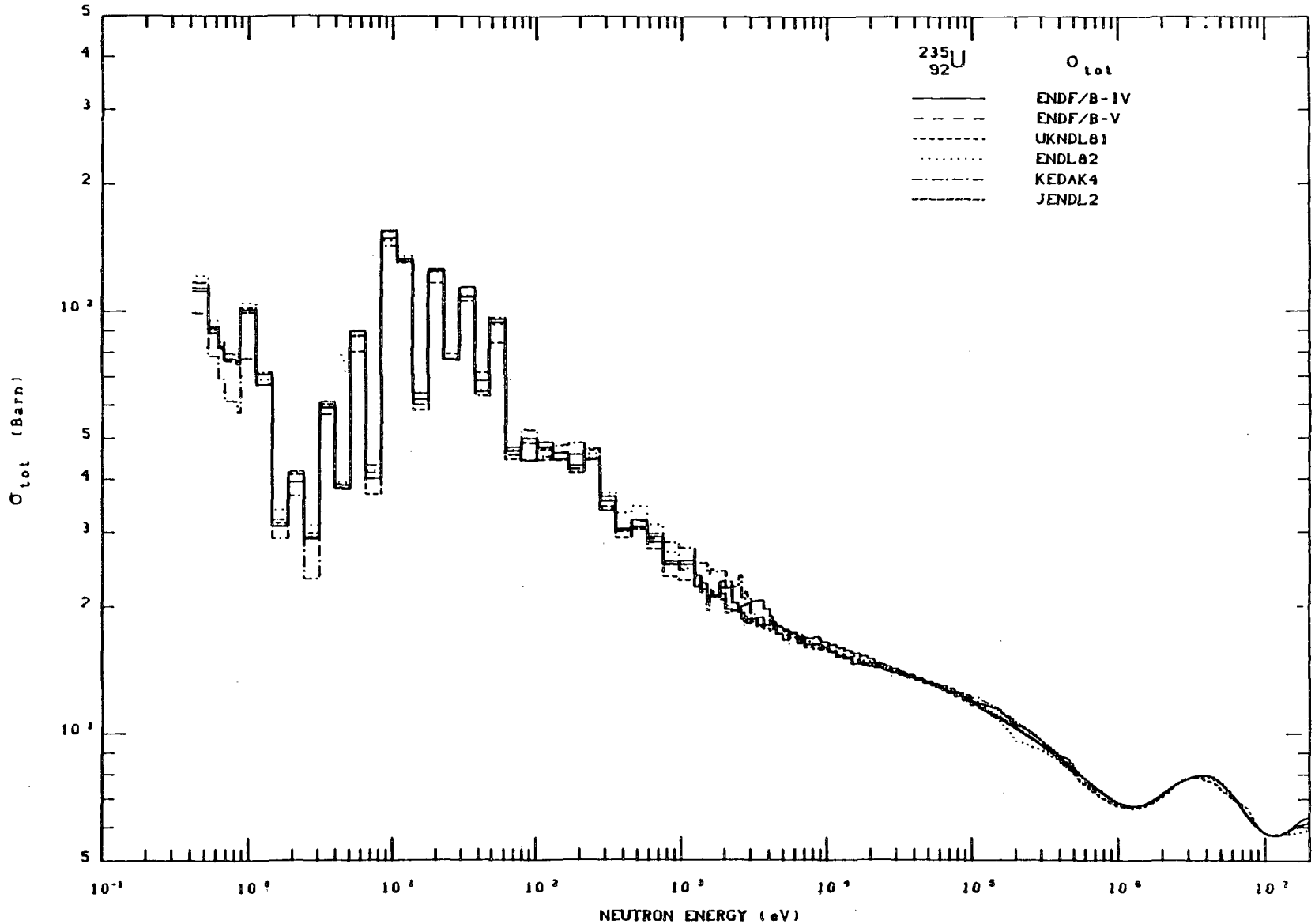
$9.8 \cdot 10^{18}$ yr spontaneous fission

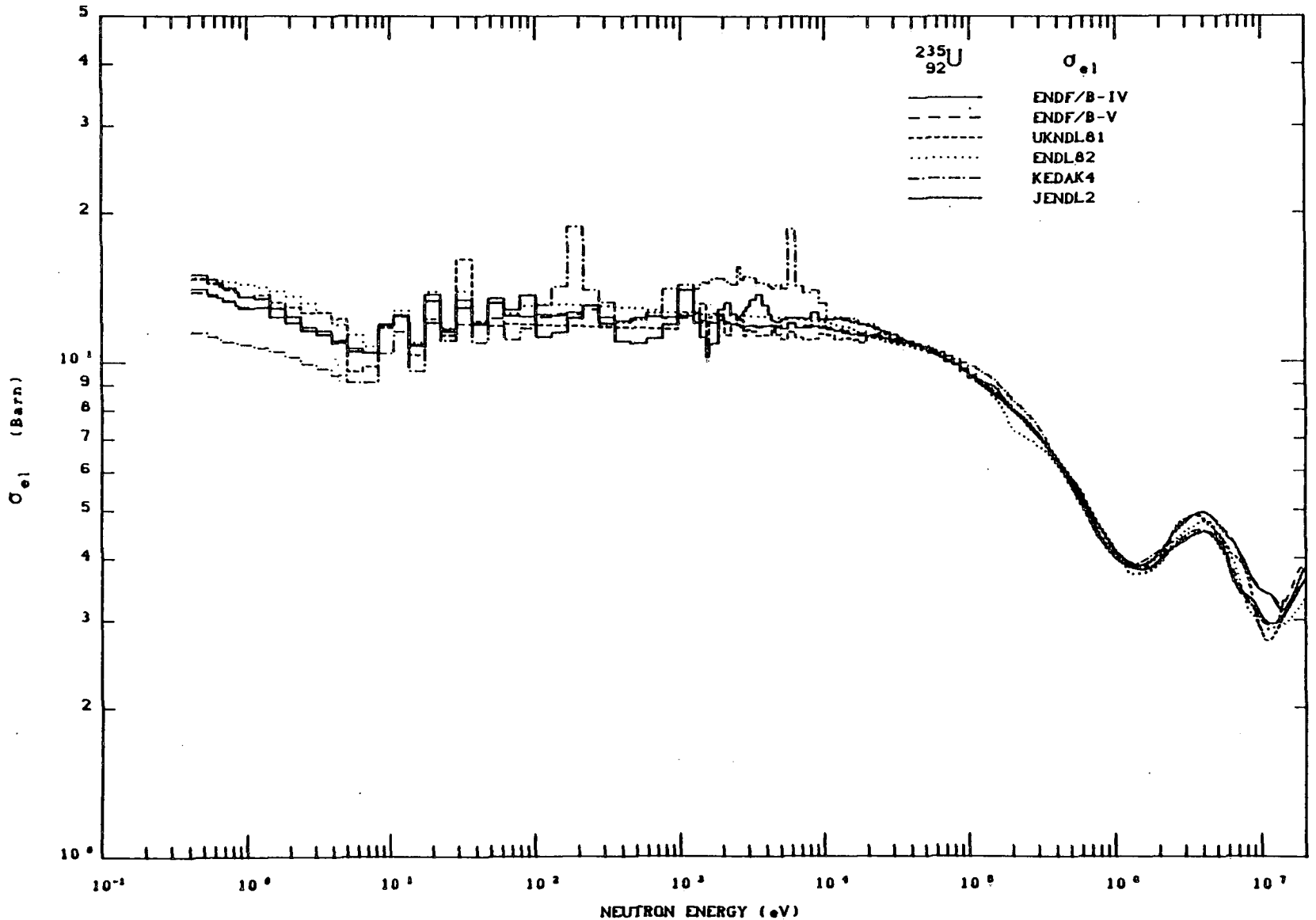
THERMAL CROSS SECTIONS (2200 m/s)

Reference	σ_γ	σ_f	σ_t	$\bar{\nu}_+$	(barns)
ENDF/B - IV	97.7	585.4		2.419	
ENDF/B - V	98.44	583.9	696.6	2.437	
UKNDL -81	100.5	579.4	696.1		
ENDL -82	100.9	602.0	717.9		
KEDAK-4	99.43	587.9	699.5		
JENDL-2	96.00	583.9	696.9		
71 GEL DERUYTTER		590.5			
BNL 325 (1984)	98.3	582.6	695.2	2.425	
NNDC (1983)	98.52	581.9		2.429	
84 NPL,AXTON	96.8	584.7		2.427	

RESONANCE INTEGRALS

Reference	RI_γ	RI_f	(barns)
ENDF/B - IV	127.8	261.4	
ENDF/B - V	139.2	281.7	
UKNDL -81	140.6	275.5	
ENDL -82	139.8	284.0	
KEDAK-4	142.7	269.1	
JENDL-2	153.5	278.7	
71 KAP,EILAND	150	292	
BNL 325 (1984)	144	275	


$^{235}_{92}U$
σ_{tot}
ENDF/B-IV
ENDF/B-V
UKNDL81
ENDL82
KEDAK4
JENDL2
σ_{tot} (Barn)
NEUTRON ENERGY (eV)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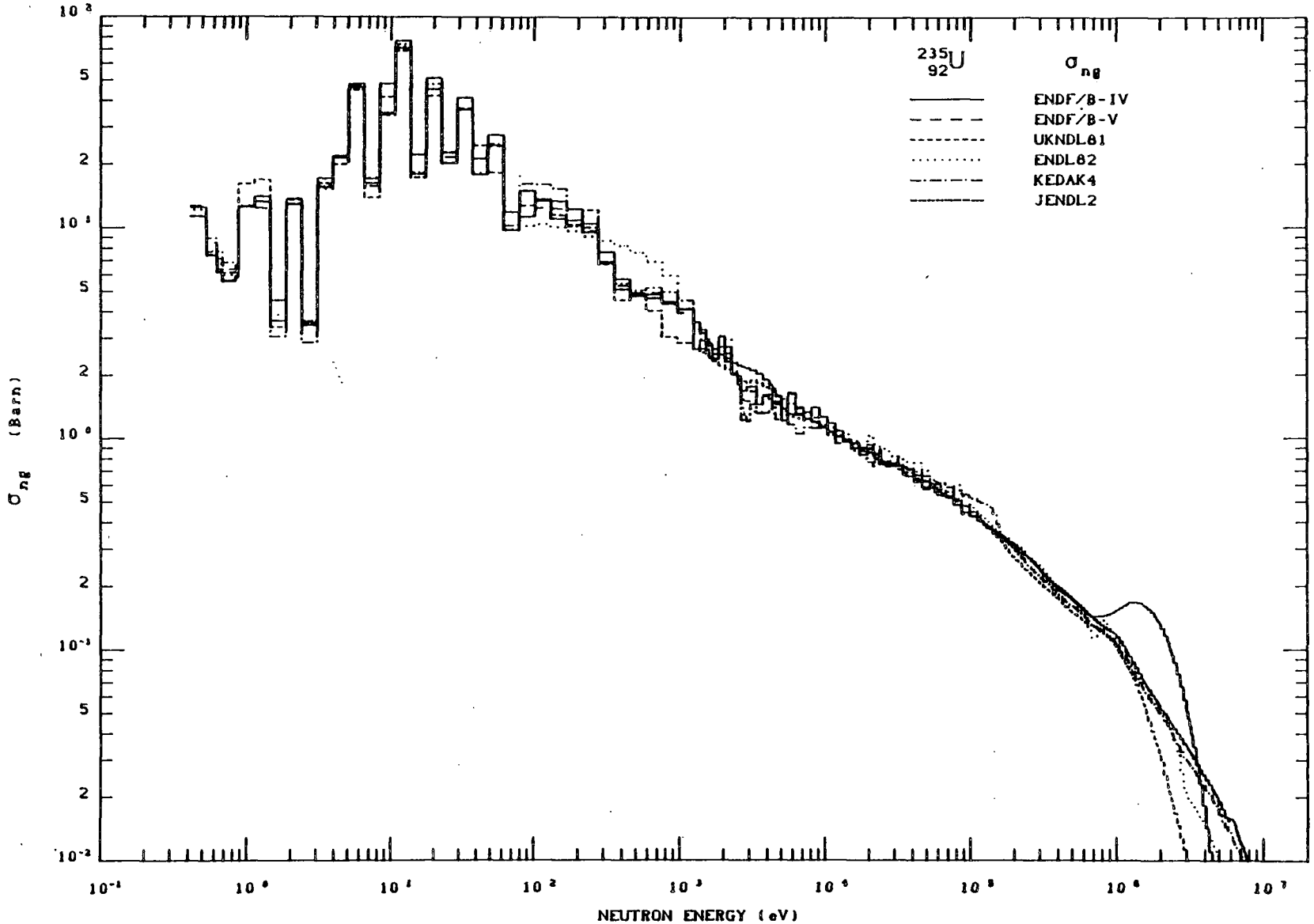
σ_{el}
ENDF/B-IV
ENDF/B-V
UKNDL81
ENDL82
KEDAK4
JENDL2
σ_{el} (Barn)
NEUTRON ENERGY (eV)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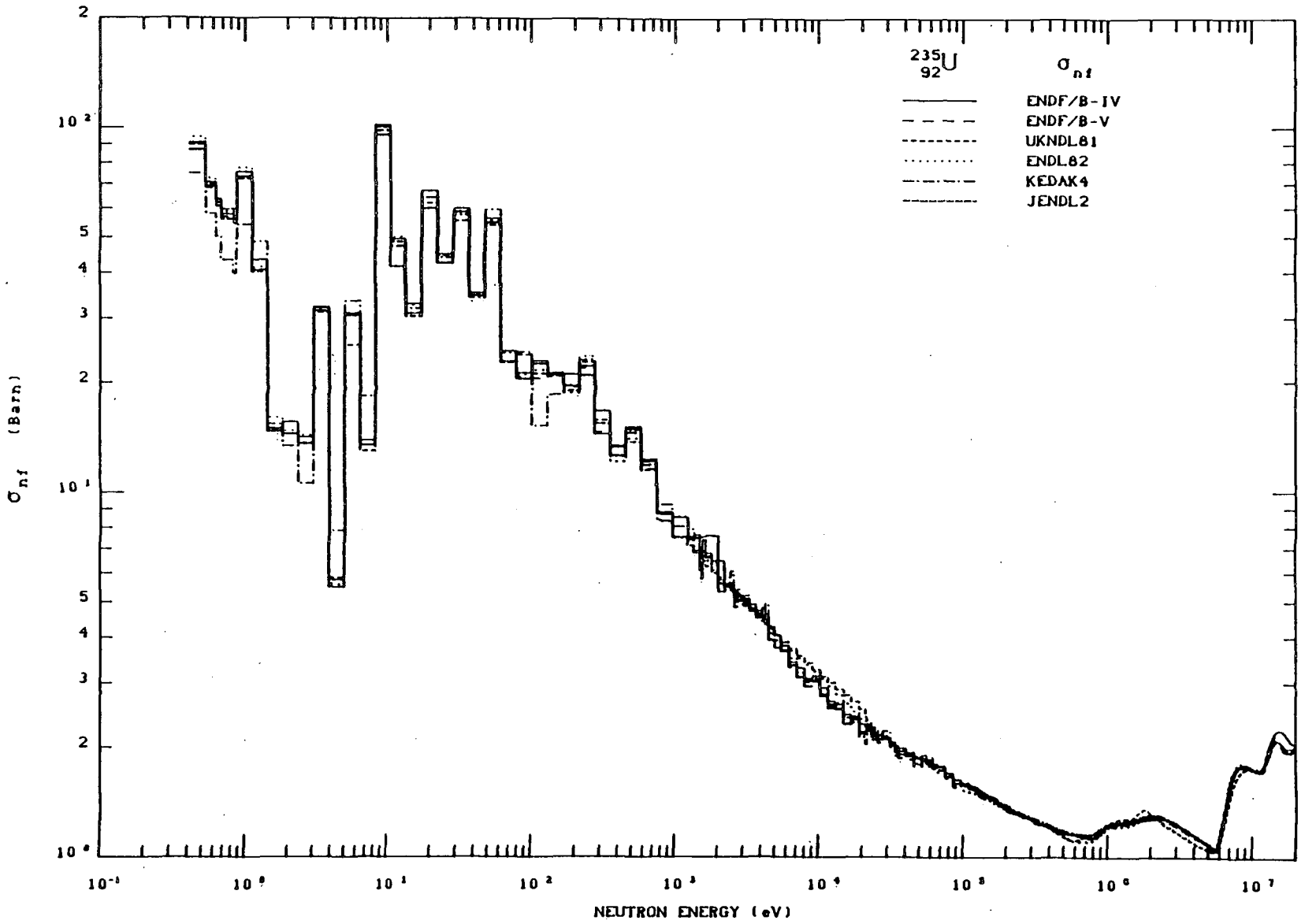
ENDL82
KEDAK4
JENDL2
σ_{ng} (Barn)
NEUTRON ENERGY (eV)


$^{235}_{92}U$
σ_{nf}
ENDF/B-IV
ENDF/B-V
UKNDL81
ENDL82
KEDAK4
JENDL2
σ_{nf} (Barn)
NEUTRON ENERGY (eV)

$^{235}_{92}U$

^{238}U

NUCLEAR PROPERTIES

Spin and parity of ground state: 0^+

Ground state decay:

Alpha to ^{234}Th: 100%, Q_α = 4.270 MeV

Half-life: $4.468 \cdot 10^9$ yr

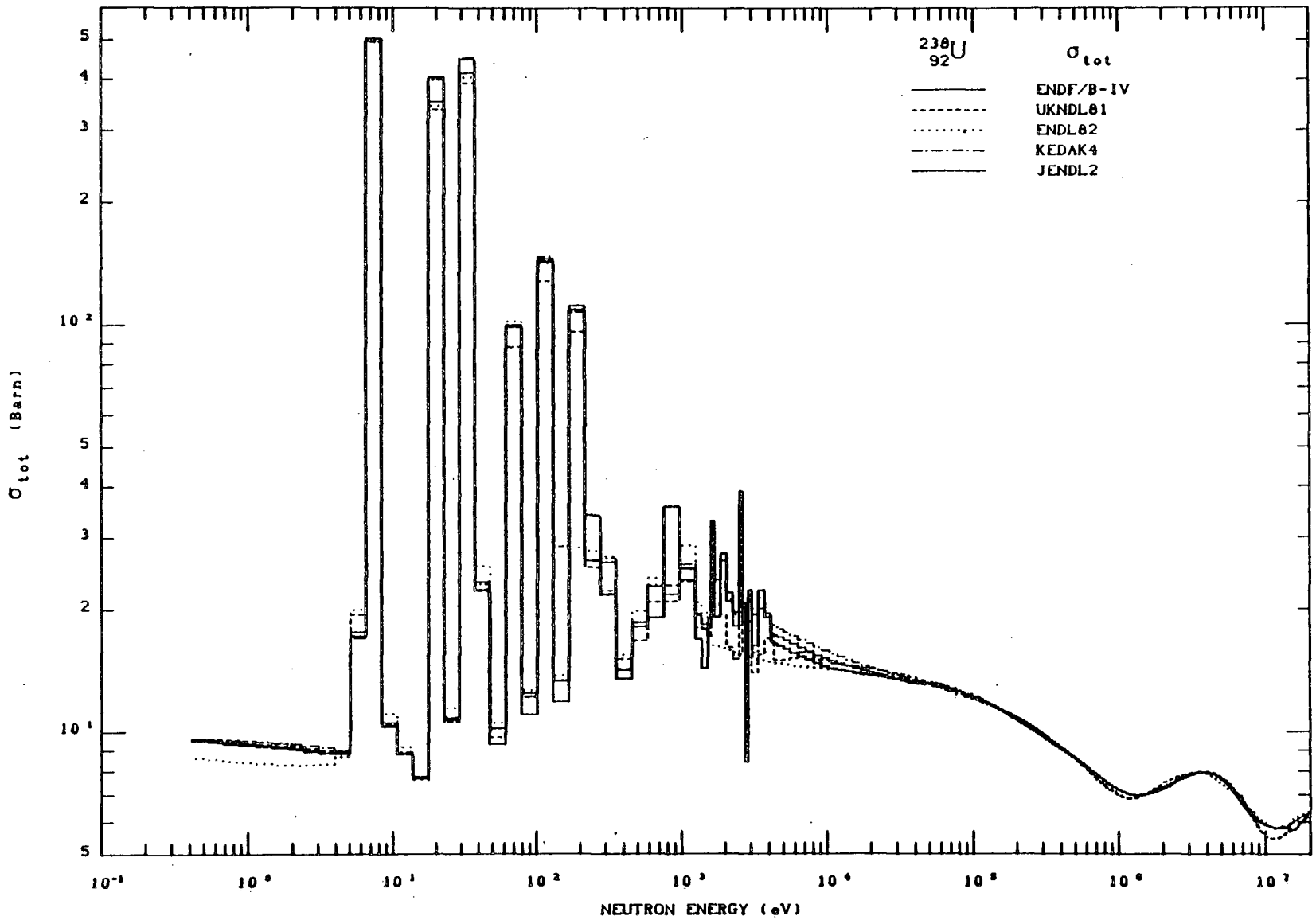
$8.19 \cdot 10^{15}$ yr - spontaneous fission

THERMAL CROSS SECTIONS (2200 m/s)

Reference	σ_γ	σ_f	σ_t	$\bar{\nu}_{sp}$	(barns)
ENDF/B - IV	2.70	0.00	11.65		
ENDF/B - V	2.700	$5.280 \cdot 10^{-6}$	11.60		
UKNDL -81	2.730		10.74		
ENDL -82	2.736		10.69		
KEDAK-4	2.714		11.67		
JENDL-2	2.700	$3.239\ 10^{-6}$	11.57		
BNL 325 (1984)	2.680	0.004		1.98	

RESONANCE INTEGRALS

Reference	RI_γ	RI_f	(barns)
ENDF/B - IV	268.0	0.0	
ENDF/B - V	279.5	2.032	
UKNDL -81	269.6	1.593	
ENDL -82	274.2	2.056	
KEDAK-4	279.0	1.654	
JENDL-2	279.0	2.053	
72 KJL,STEINNES	267	0.0	
BNL 325 (1984)	277	0.0	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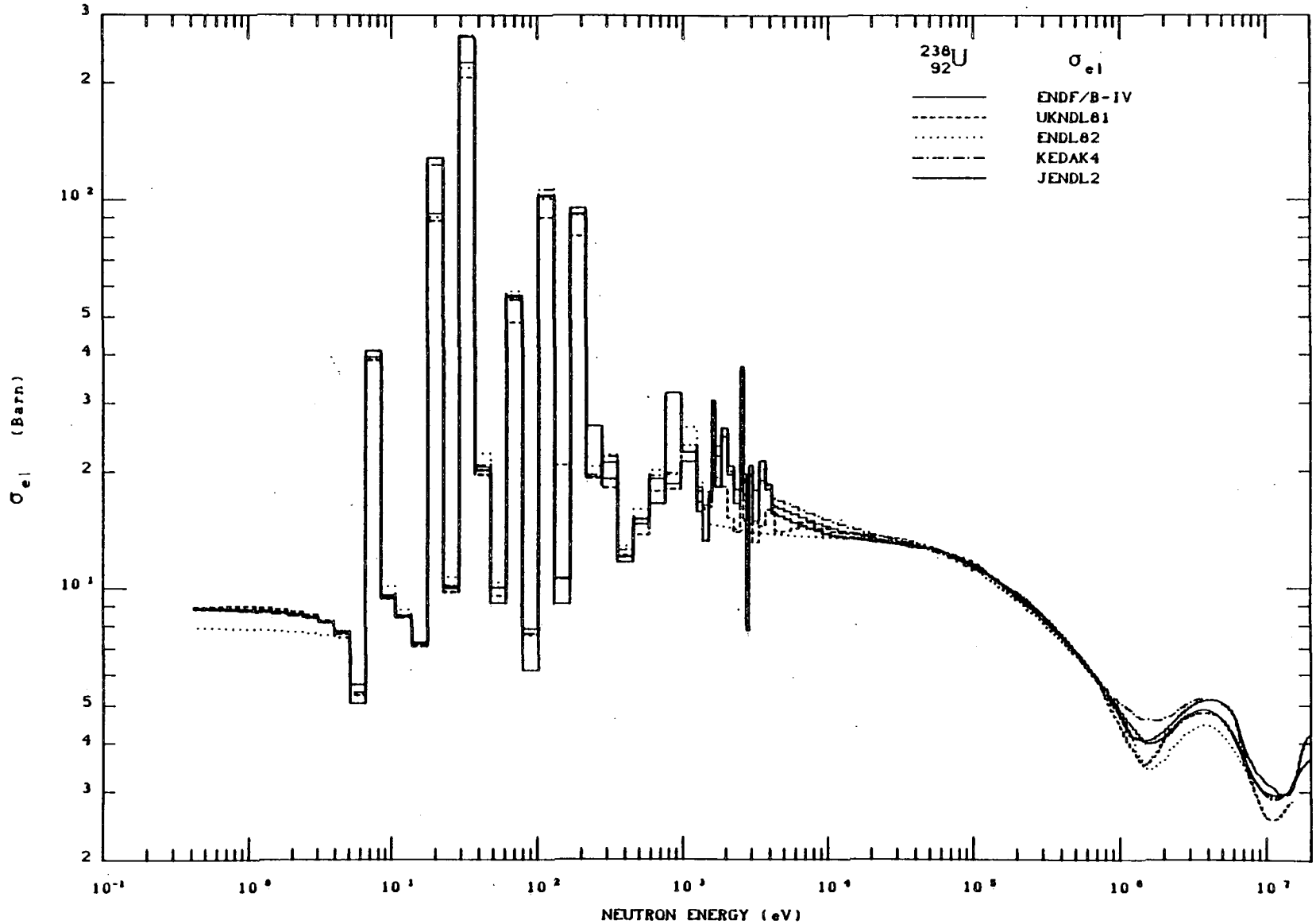
ENDF/B-IV
UKNDL81
ENDL82
KEDAK4
JENDL2
σ_{tot} (Barn)
NEUTRON ENERGY (eV)


238 92 U
σel
ENDF/B-IV
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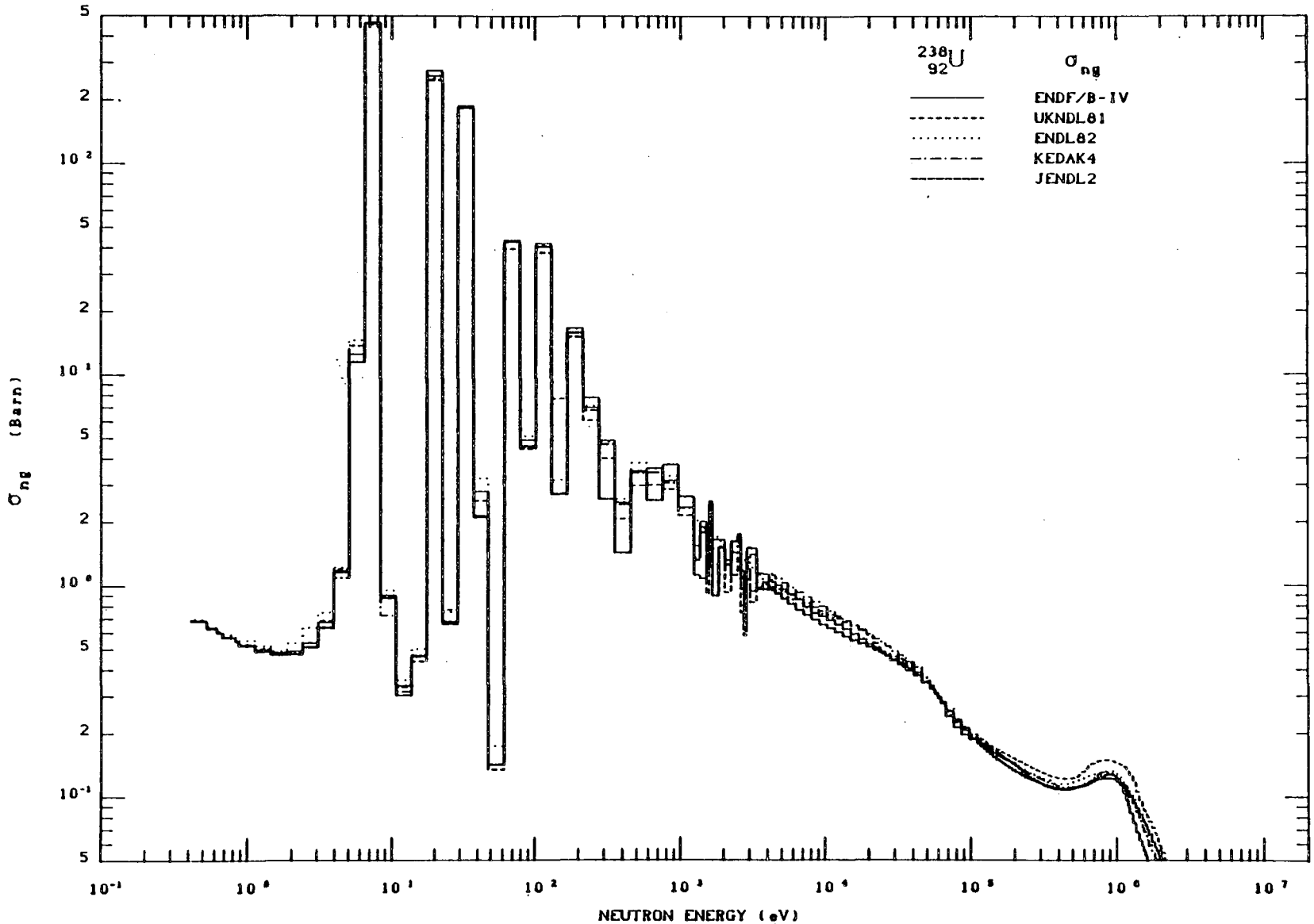
ENDL82
KEDAK4
JENDL2
σel (Barn)
NEUTRON ENERGY (eV)

238 92 U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92
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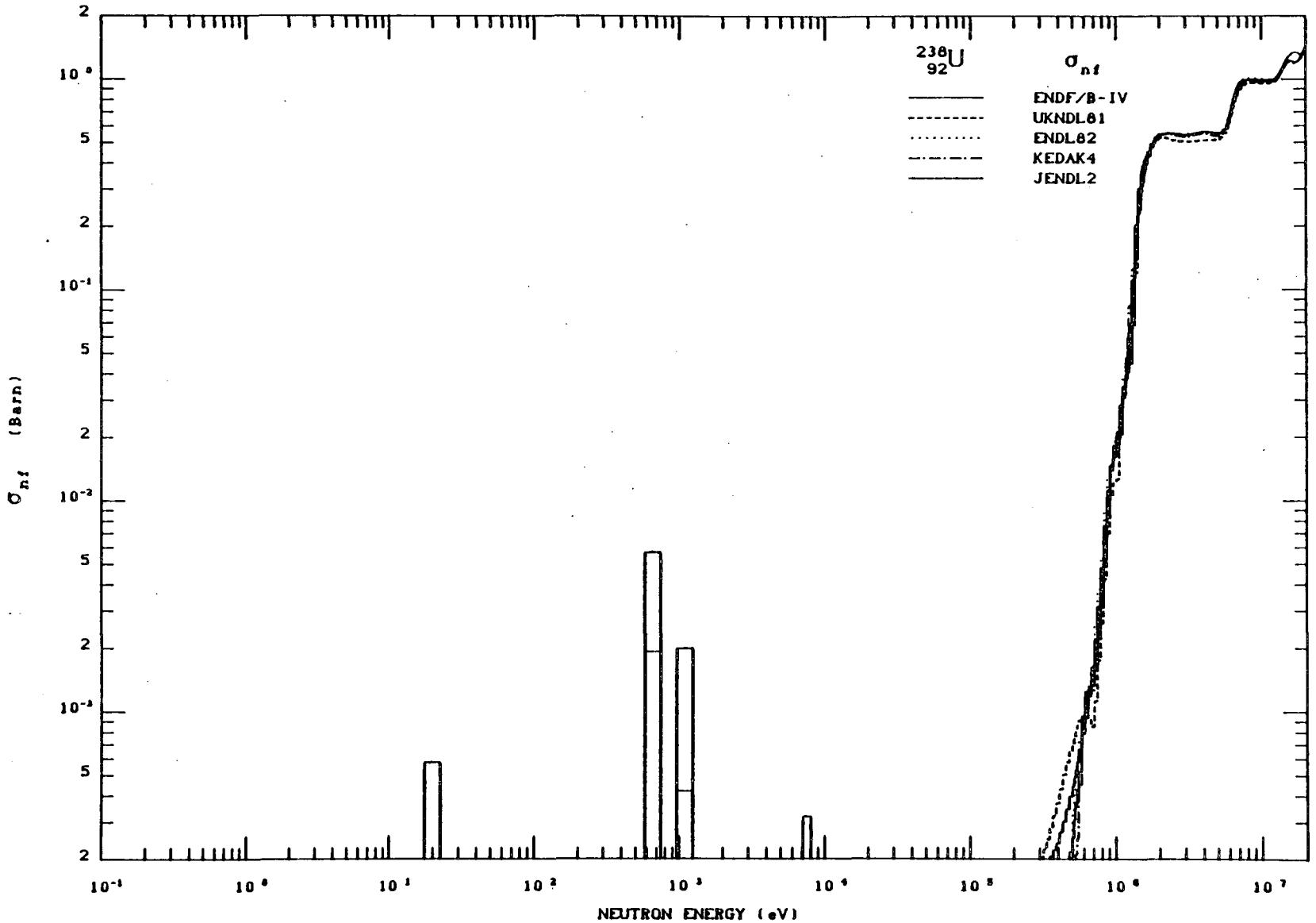
KEDAK4
JENDL2
σng (Barn)
NEUTRON ENERGY (eV)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σ_{nf}
ENDF/B-IV
UKNDL81
ENDL82
KEDAK4
JENDL2
σ_{nf} (Barn)
NEUTRON ENERGY (eV)

$^{238}_{92}U$

^{237}Np

NUCLEAR PROPERTIES

Spin and parity of ground state: $5/2^+$

Ground state decay:

Alpha to ^{233}Pa: 100%, Q_α = 4.957 MeV

Half-life: $2.14 \cdot 10^6$ yr

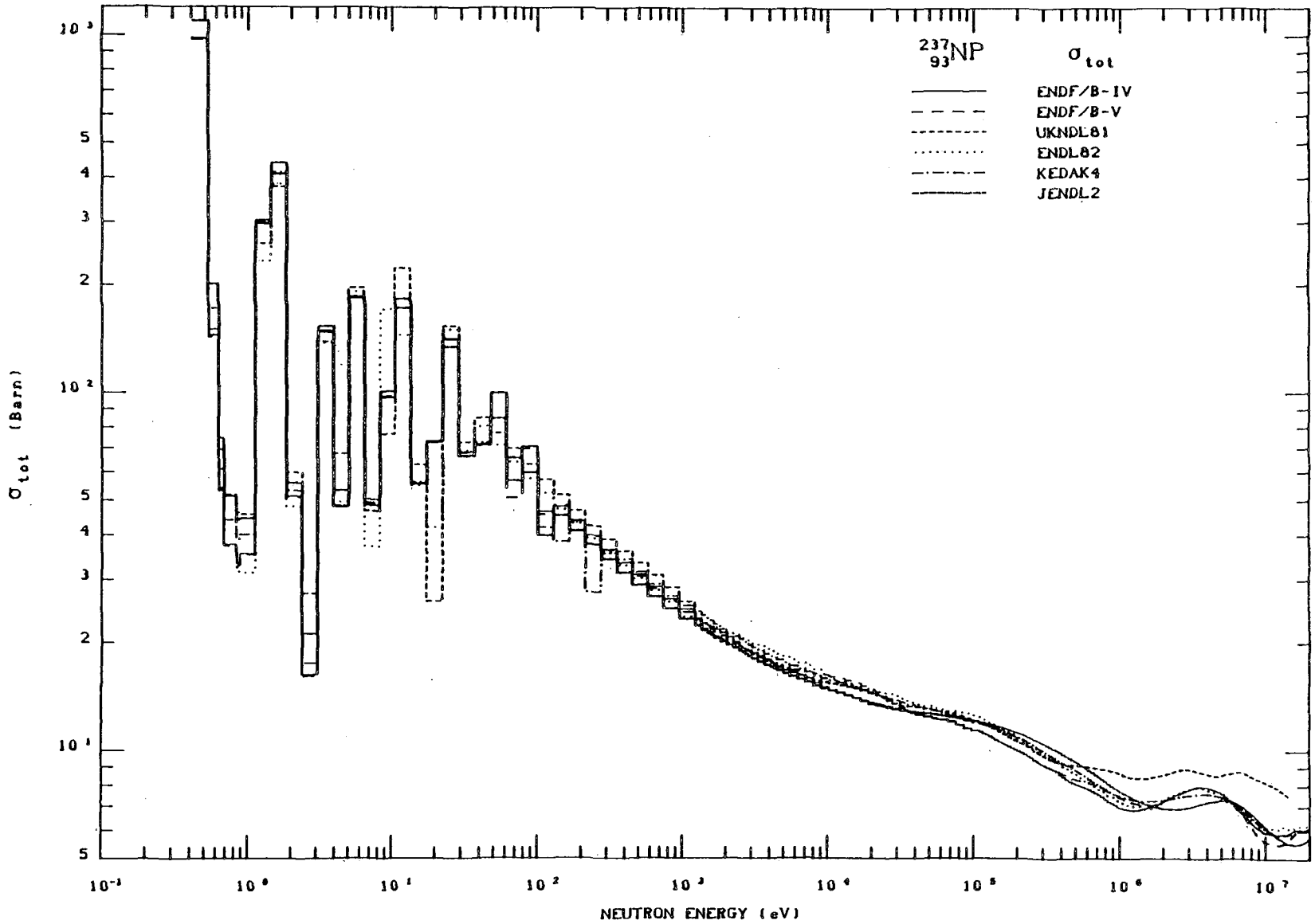
$\cdot 10^{18}$ yr - spontaneous fission

THERMAL CROSS SECTIONS (2200 m/s)

Reference	σ_γ	σ_f	σ_t	$\bar{\nu}_p$	(barns)
ENDF/B - IV	169.1	0.02	186.6		
ENDF/B - V	169.1	0.01663	186.7		
UKNDL -81	169.0	0.01903	181.0		
ENDL -82	169.7	0.01498	187.3		
KEDAK-4	169.1	0.01701	186.6		
JENDL-2	180.7	0.01930	208.9		
BNL 325 (1984)	175.9	0.02		2.525	

RESONANCE INTEGRALS

Reference	RI_γ	RI_f	(barns)
ENDF/B - IV	634.6	0.26	
ENDF/B - V	640.4	6.870	
UKNDL -81	652.0	6.906	
ENDL -82	591.5	7.478	
KEDAK-4	642.8	5.845	
JENDL-2	662.5	6.255	
68 MTR,SCOVILLE	900		
BNL 325 (1984)	640	6.9	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ENDF/B-V
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ENDL82
KEDAK4
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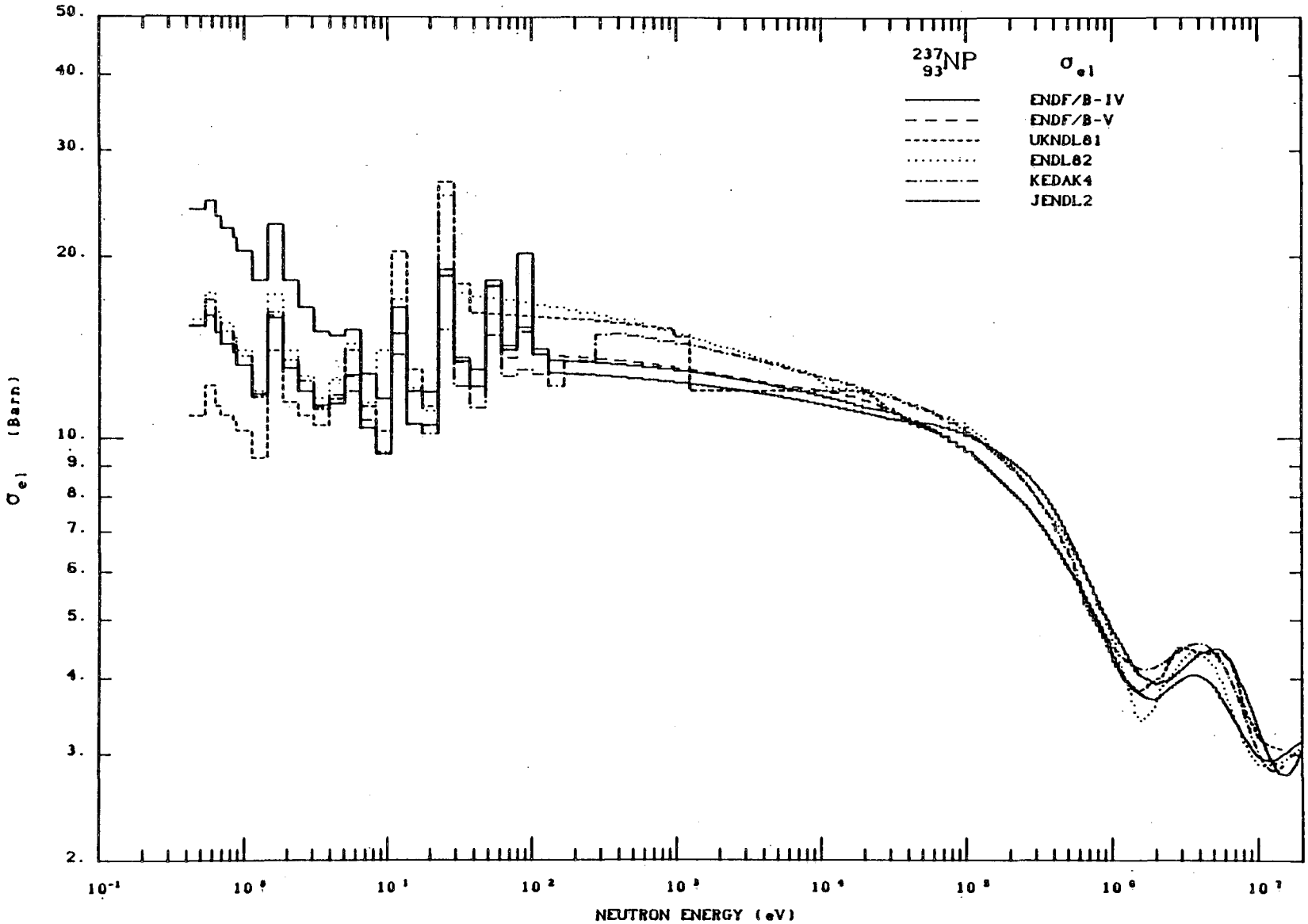
NEUTRON ENERGY (eV)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50.
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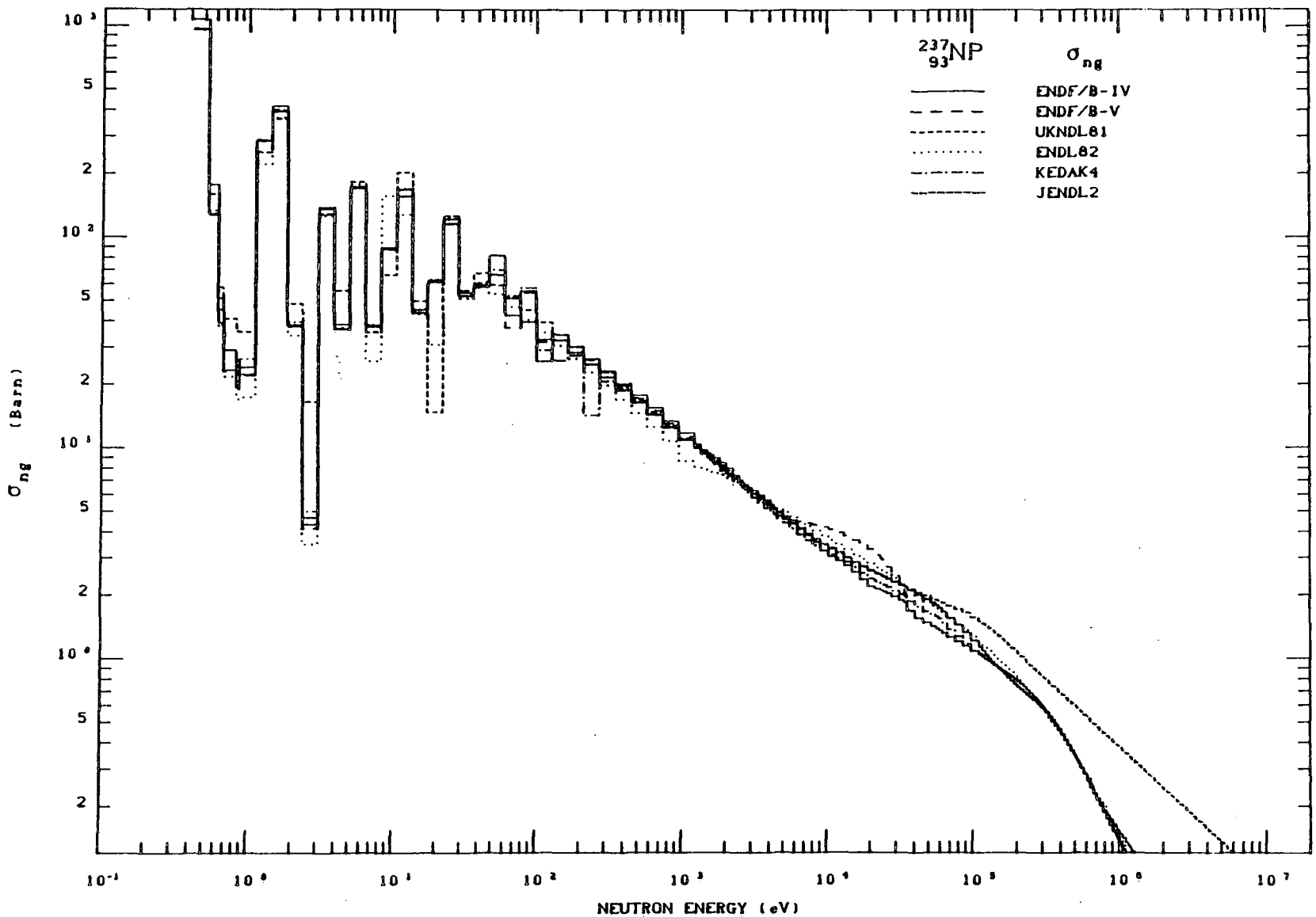
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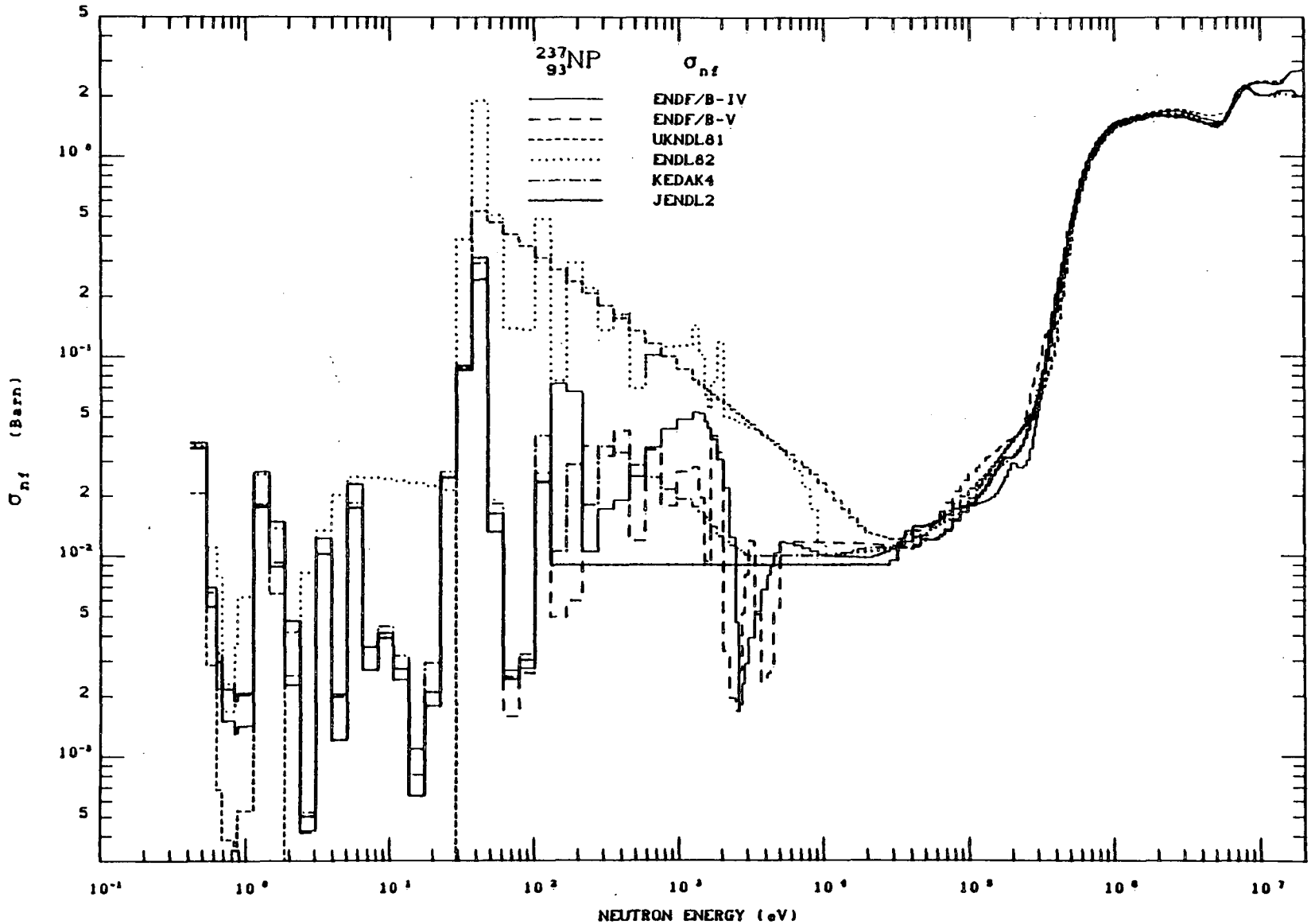
JENDL2
σ_{ng} (Barn)
NEUTRON ENERGY (eV)


$^{237}_{93}$NP
σ_{nf}
ENDF/B-IV
ENDF/B-V
UKNDL81
ENDL82
KEDAK4
JENDL2
σ_{nf} (Barn)
NEUTRON ENERGY (eV)

^{239}Pu

NUCLEAR PROPERTIES

Spin and parity of ground state: $1/2^+$

Ground state decay:

Alpha to ^{235}U: 100%, Q_α = 5.244 MeV

Half-life: $2.411 \cdot 10^4$ yr

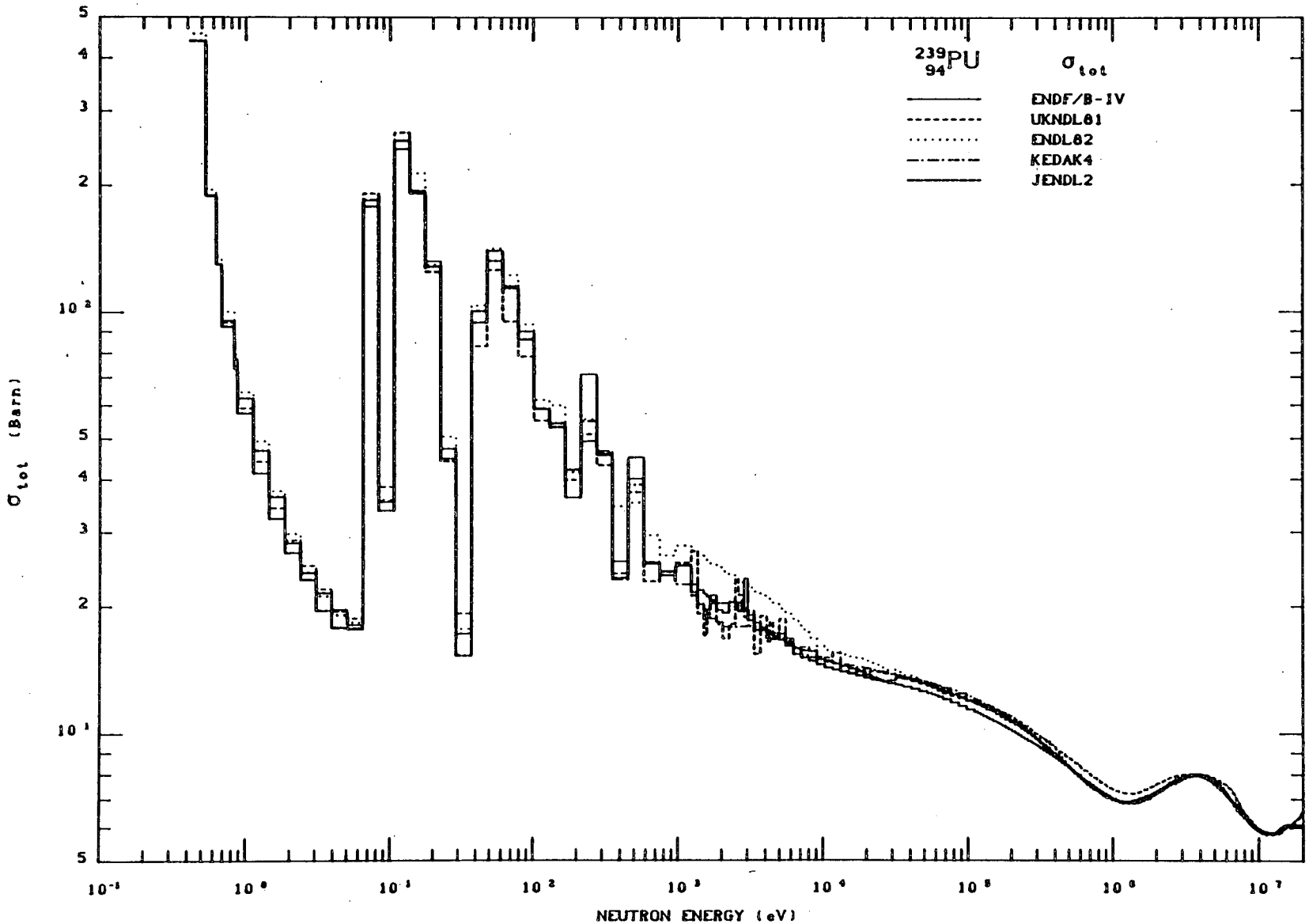
$5.5 \cdot 10^{15}$ yr - spontaneous fission

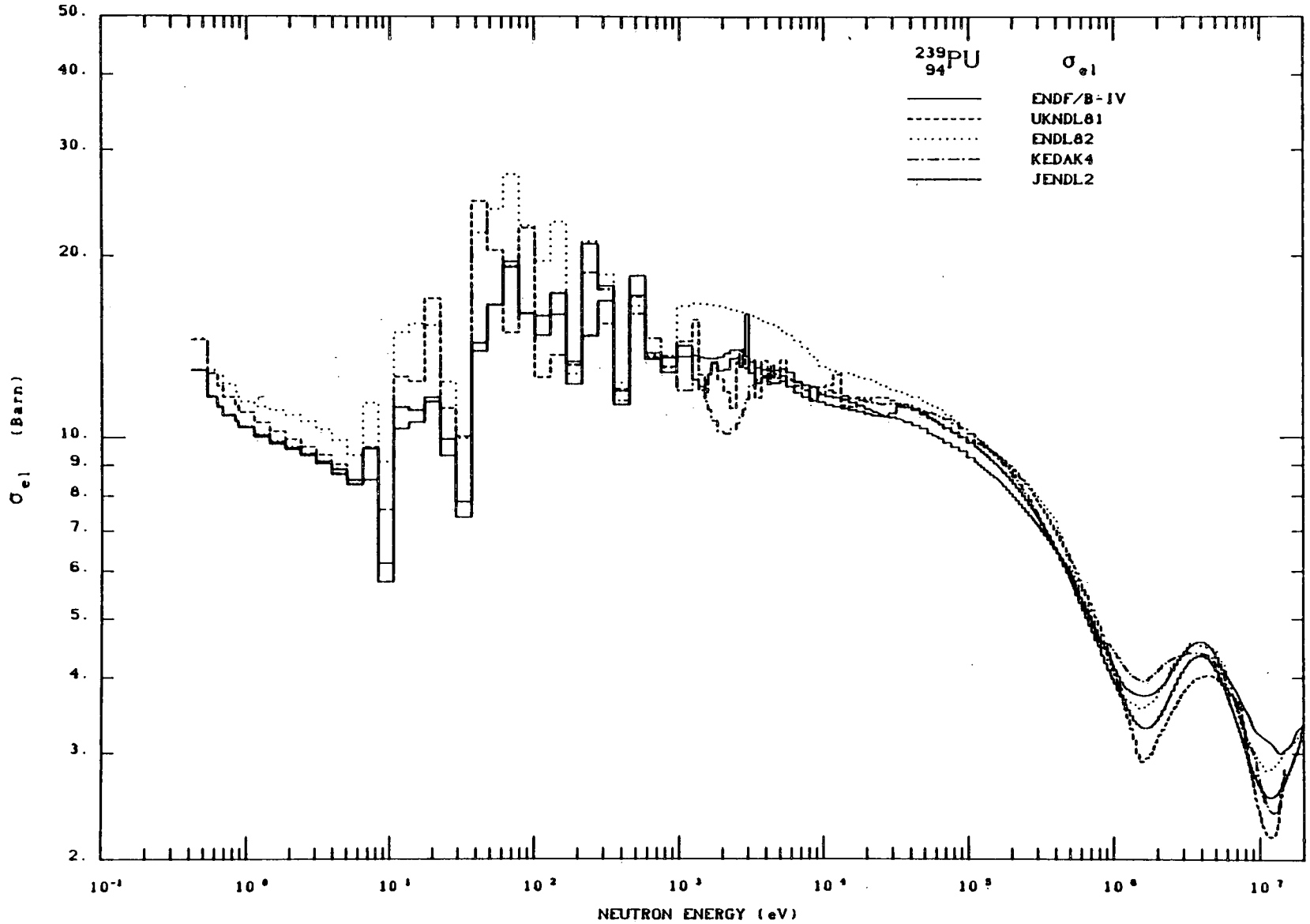
THERMAL CROSS SECTIONS (2200 m/s)

Reference	σ_γ	σ_f	σ_t	$\bar{\nu}_+$	(barns)
ENDF/B - IV	270.2	741.7	1020	2.873	
ENDF/B - V	270.2	741.7	1020	2.891	
UKNDL -81	265.7	742.4	1018		
ENDL -82	278.0	785.7	1075		
KEDAK-4	270.7	745.3	1023		
JENDL-2	270.2	741.7	1020		
70 GEL, DERUYTTER		742.5			
BNL 325 (1984)	269.3	748.1	1024.9	2.877	
NNDC (1983)	268.98	748.23		2.878	
84 NPL,AXTON	269.4	748.3		2.876	

RESONANCE INTEGRALS

Reference	RI_γ	RI_f	(barns)
ENDF/B - IV	192.4	288.0	
ENDF/B - V	193.3	303.5	
UKNDL -81	179.8	301.2	
ENDL -82	205.3	306.7	
KEDAK-4	194.0	304.2	
JENDL-2	195.2	301.50	
71 KAP,EILAND		327	
BNL 325 (1984)	200	301	


$^{239}_{94}$PU
σ_{tot}
ENDF/B-IV
UKNDL81
ENDL82
KEDAK4
JENDL2
σ_{tot} (Barn)
NEUTRON ENERGY (eV)


$^{239}_{94}$PU
σ_{el}
ENDF/B-IV
UKNDL81
ENDL82
KEDAK4
JENDL2
σ_{el} (Barn)
NEUTRON ENERGY (eV)
50.
40.
30.
20.
10.
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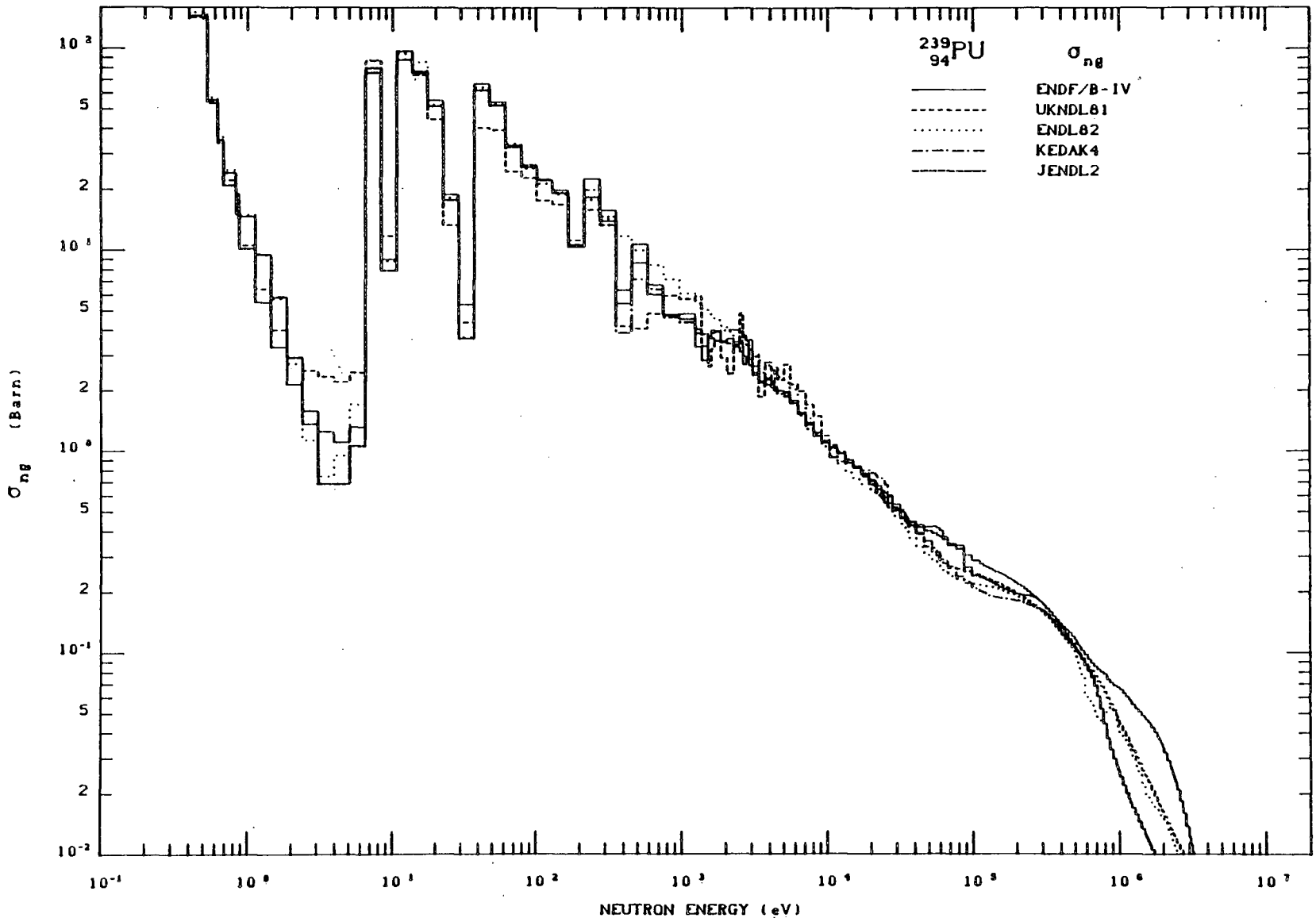
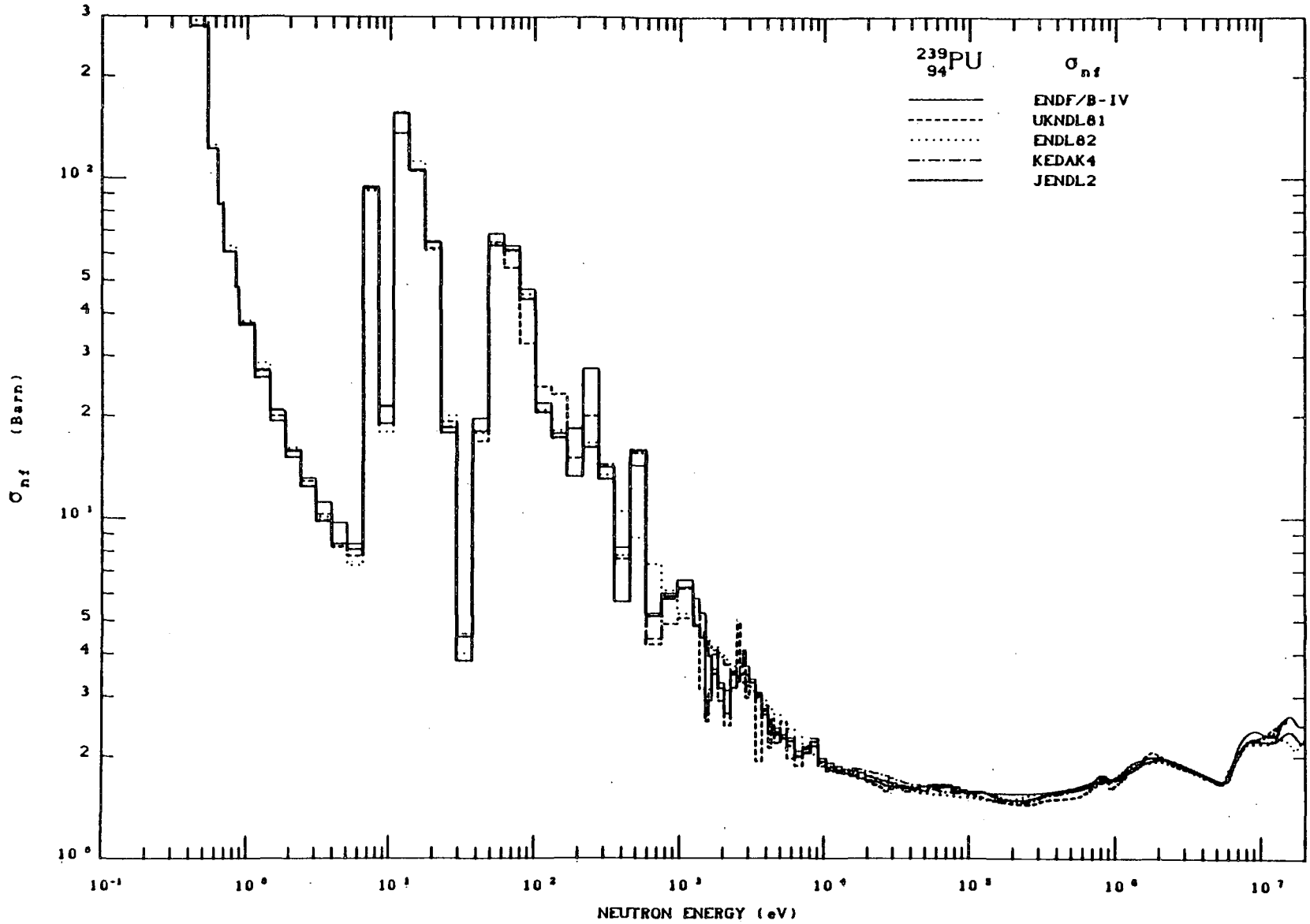
2.
10^{-1}
10^{0}
10^{1}
10^{2}
10^{3}
10^{4}
10^{5}
10^{6}
10^{7}

$^{239}_{94}$Pu


$^{239}_{94}$PU
σ_{ng}
ENDF/B-IV
UKNDL81
ENDL82
KEDAK4
JENDL2
σ_{ng} (Barn)
NEUTRON ENERGY (eV)


$^{239}_{94}$PU
σ_{nf}
ENDF/B-IV
UKNDL81
ENDL82
KEDAK4
JENDL2
σ_{nf} (Barn)
NEUTRON ENERGY (eV)

$^{239}_{94}$Pu

^{240}Pu

NUCLEAR PROPERTIES

Spin and parity of ground state: 0^+

Ground state decay:

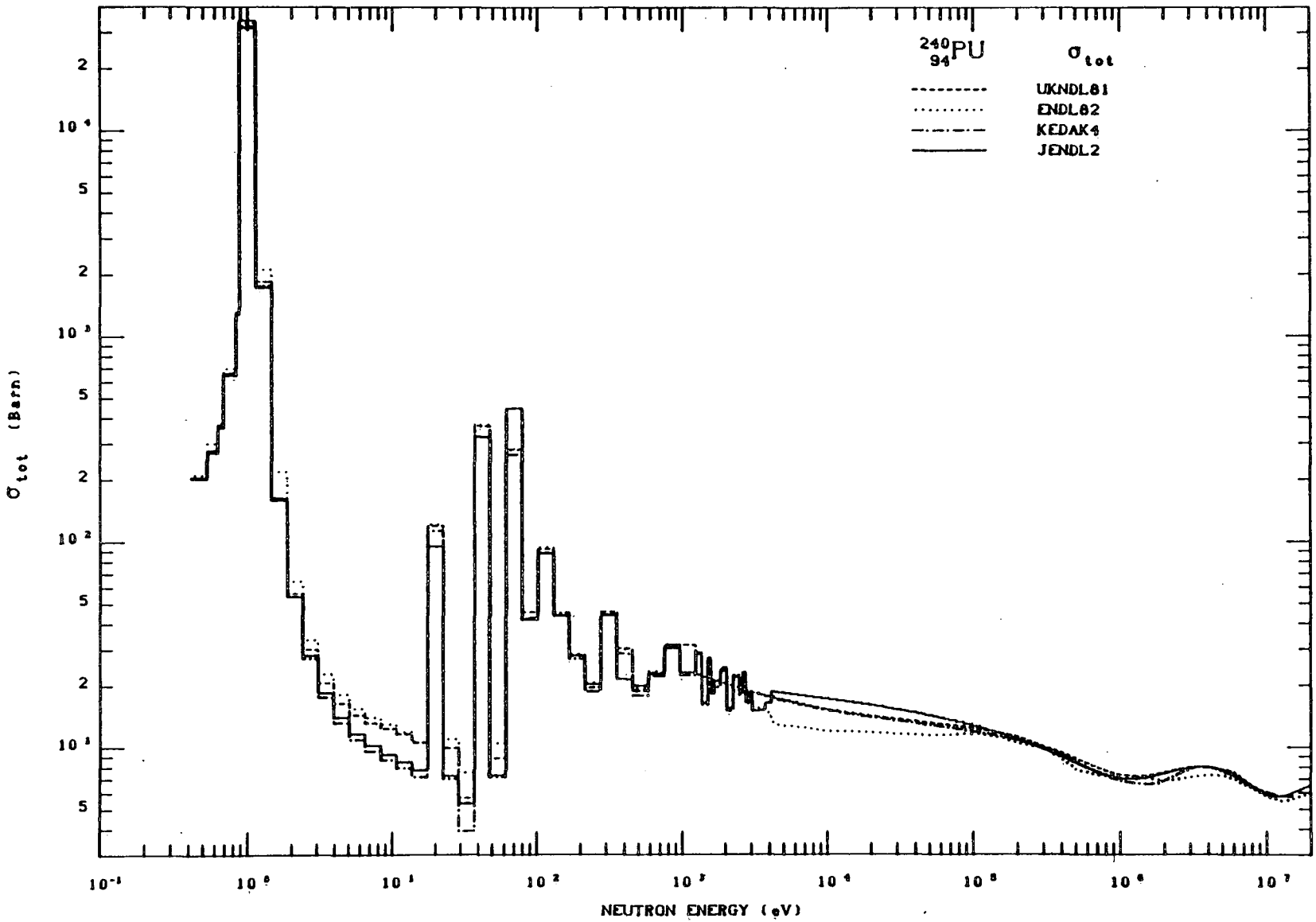
Alpha to ^{236}U: 100%, Q_α = 5.256 MeV
Half life: $6.550 \cdot 10^3$ yr
$1.15 \cdot 10^{11}$ yr - spontaneous fission

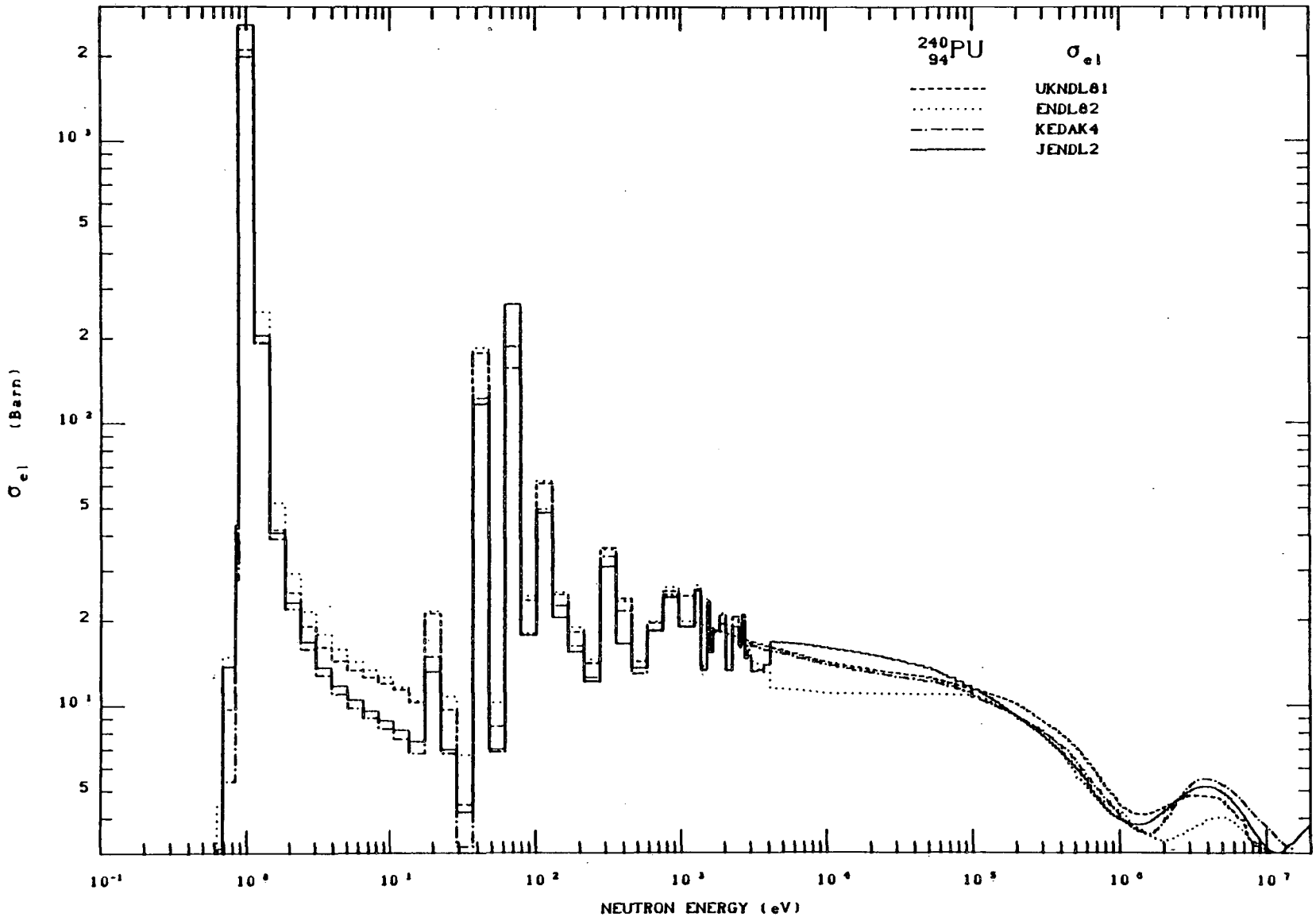
THERMAL CROSS SECTIONS (2200 m/s)

Reference	σ_γ	σ_f	σ_t	$\bar{\nu}_{sp}$	(barns)
ENDF/B - IV	290.0	0.06	293.8		
ENDF/B - V	289.9	0.05709	291.5		
UKNDL -81	280.9	$7.715\ 10^{-3}$	283.2		
ENDL -82	301.5	0.06014	307.0		
KEDAK-4	290.4	0.06121	289.3		
JENDL-2	288.4	0.06763	290.0		
70 CRC,LOUNSBURY	289.5				
BNL 325 (1984)	289.5	0.056		2.17	

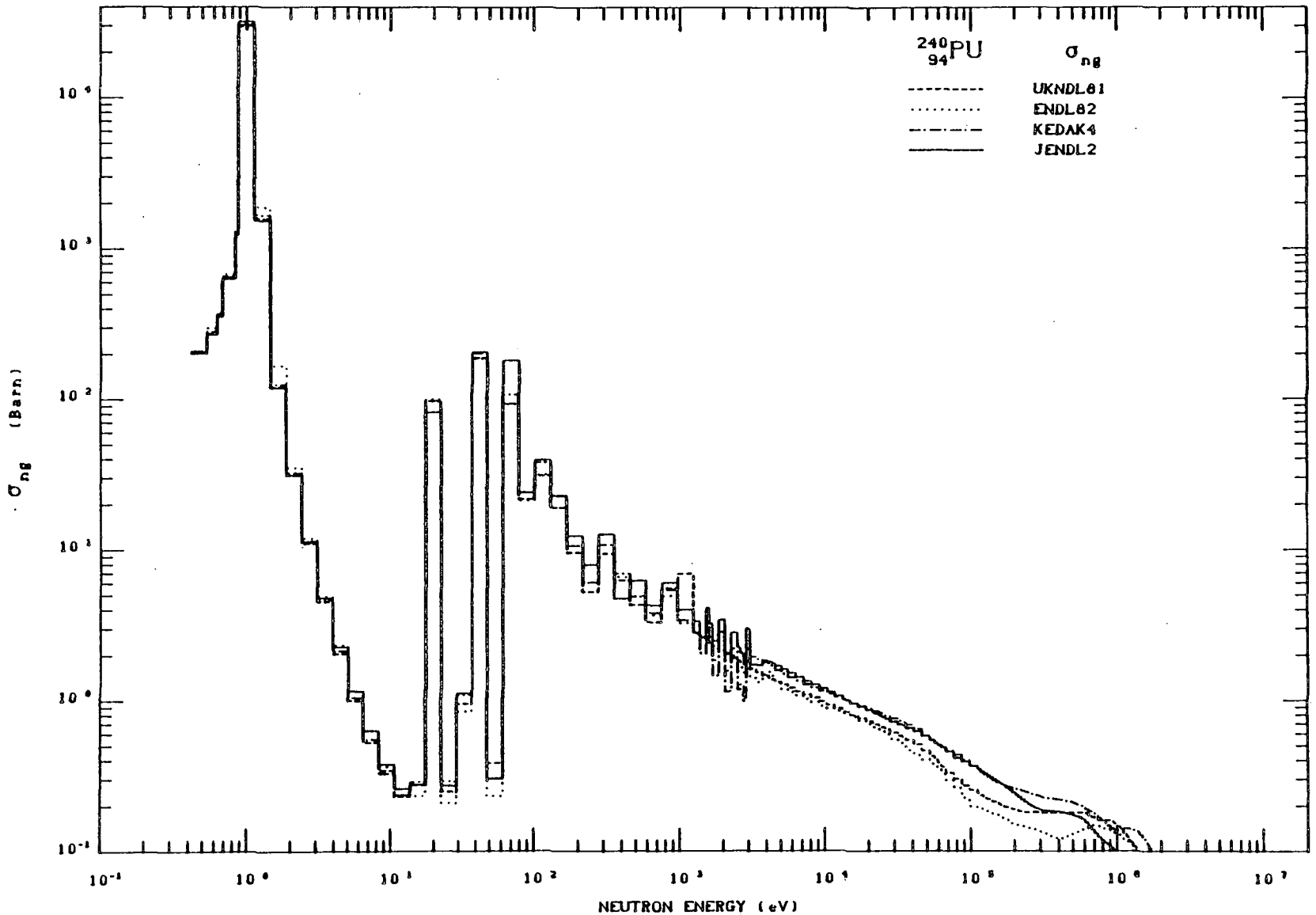
RESONANCE INTEGRALS

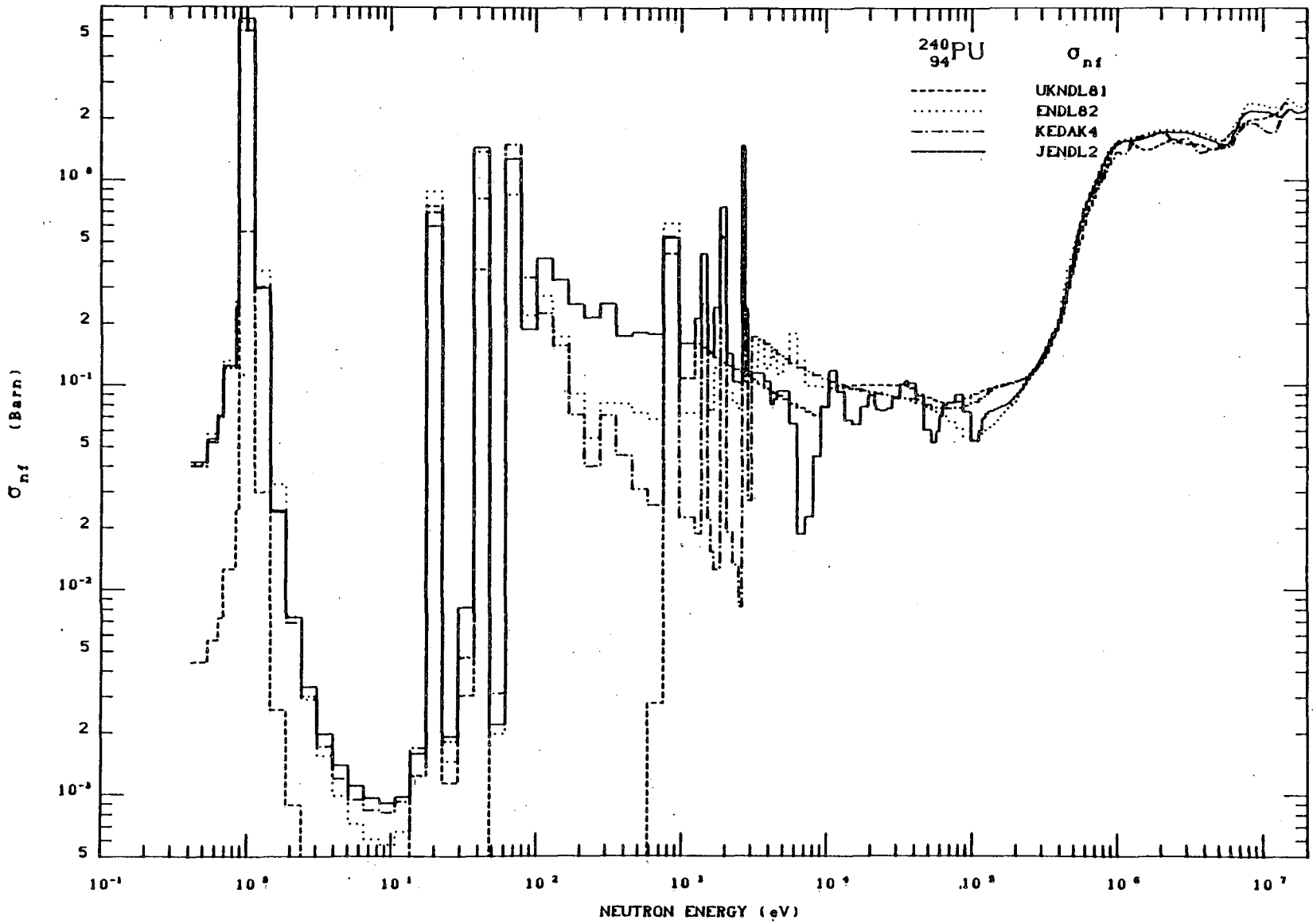
Reference	RI_γ	RI_f	(barns)
ENDF/B - IV	7793	3.2	
ENDF/B - V	7971	8.830	
UKNDL -81	8047	6.446	
ENDL -82	8329	10.03	
KEDAK-4	7982	8.359	
JENDL-2	8453	10.09	
BNL 325 (1984)	8100	8.8	


$^{240}_{94}PU$
σ_{tot}
UKNDL81
ENDL82
KEDAK4
JENDL2
σ_{tot} (Barn)
NEUTRON ENERGY (eV)


$^{240}_{94}$PU
σ_{el}
UKNDL81
ENDL82
KEDAK4
JENDL2
σ_{el} (Barn)
NEUTRON ENERGY (eV)

$^{240}_{94}$Pu


$^{240}_{94}$PU
σ_{ng}
UKNDL81
ENDL82
KEDAK4
JENDL2
σ_{ng} (Barn)
NEUTRON ENERGY (eV)


$^{240}_{94}$PU
σ_{nf}
UKNDL81
ENDL82
KEDAK4
JENDL2
σ_{nf} (Barn)
NEUTRON ENERGY (eV)

$^{240}_{94}$Pu

^{241}Pu

NUCLEAR PROPERTIES

Spin and parity of ground state: $5/2^+$

Ground state decay:

Beta (β^-) to ^{241}Am: 100%, E_β = 20.8 keV
Alpha to ^{237}U: 0.0024%, Q_α = 5.139 MeV

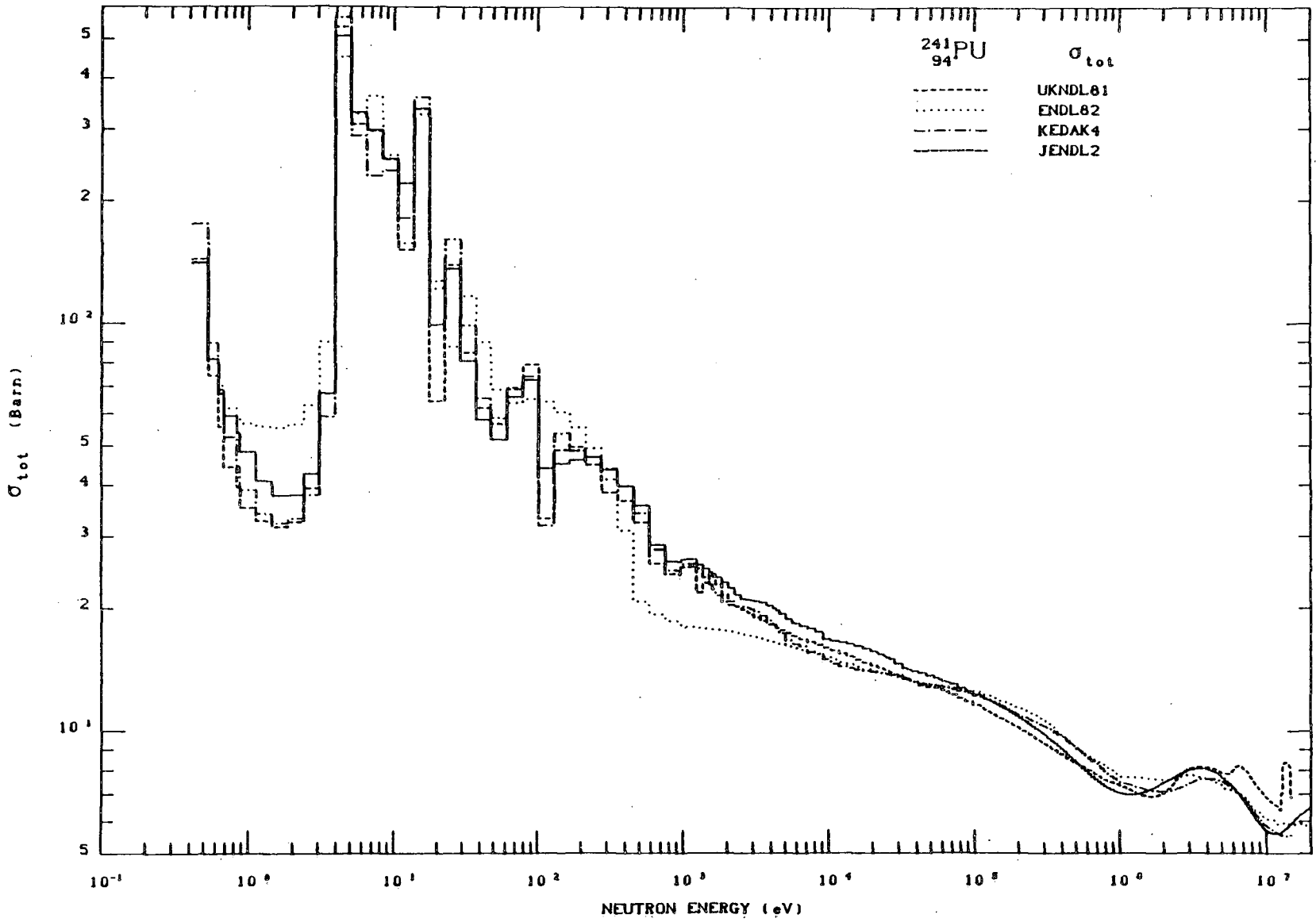
Half-life: 14.4 yr
6 10^5 yr alpha decay

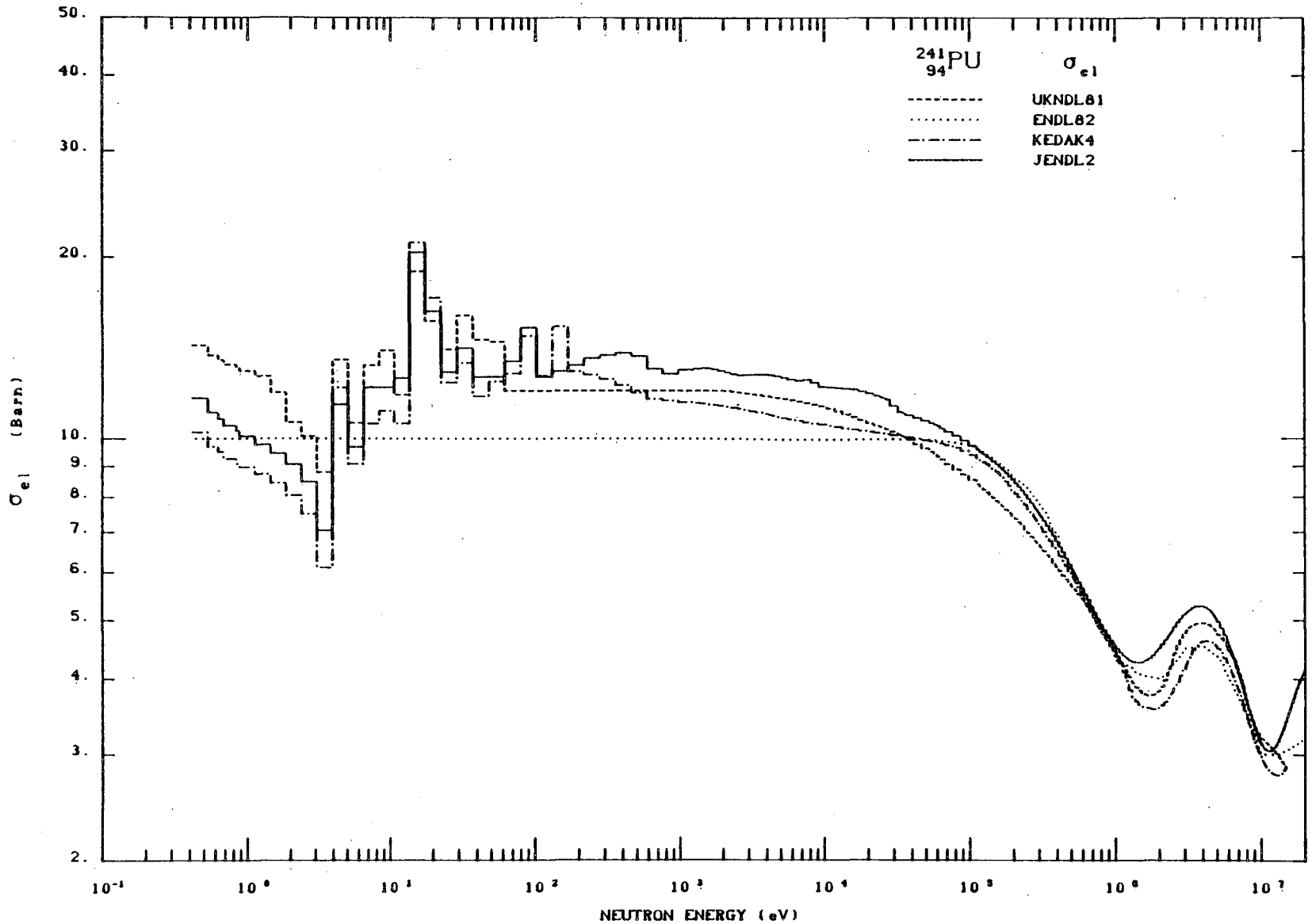
THERMAL CROSS SECTIONS (2200 m/s)

Reference	σ_γ	σ_f	σ_t	$\bar{\nu}_+$	(barns)
ENDF/B - IV	366.3	1008	1385		
ENDF/B - V	361.4	1016	1387	2.953	
UKNDL -81	355.8	1031	1400		
ENDL -82	398.6	996.5	1405		
KEDAK-4	364.8	1012	1386		
JENDL-2	362.9	1015	1388		
66 ALD,WHITE		1022			
BNL 325 (1984)	358	1011	1378	2.937	
NNDC (1983)	360.06	1011.50		2.942	
84 NPL,AXTON	360.9	1018.0		2.937	

RESONANCE INTEGRALS

Reference	RI_γ	RI_f	(barns)
ENDF/B - IV	121.0	570.5	
ENDF/B - V	196.9	588.4	
UKNDL -81	168.8	564.7	
ENDL -82	225.8	581.0	
KEDAK-4	192.6	582.3	
JENDL-2	186.8	590.3	
71 KAP, EILAND	162	569	
BNL 325 (1984)	162	570	


$^{241}_{94}$PU
σ_{tot}
UKNDL81
ENDL82
KEDAK4
JENDL2
σ_{tot} (Barn)
NEUTRON ENERGY (eV)


$^{241}_{94}$PU
σ_{el}
UKNDL81
ENDL82
KEDAK4
JENDL2
σ_{el} (Barn)
NEUTRON ENERGY (eV)
50.
40.
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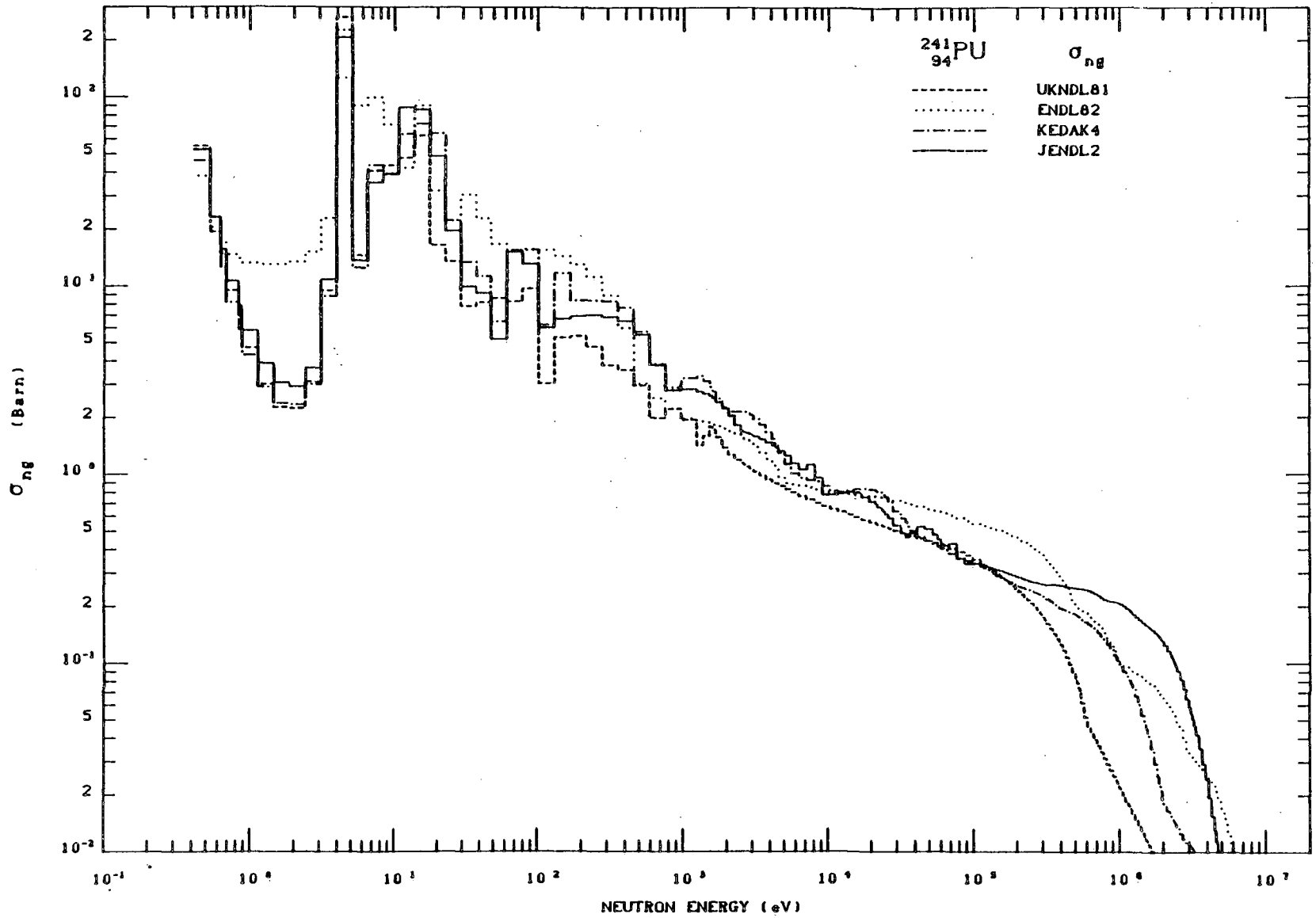
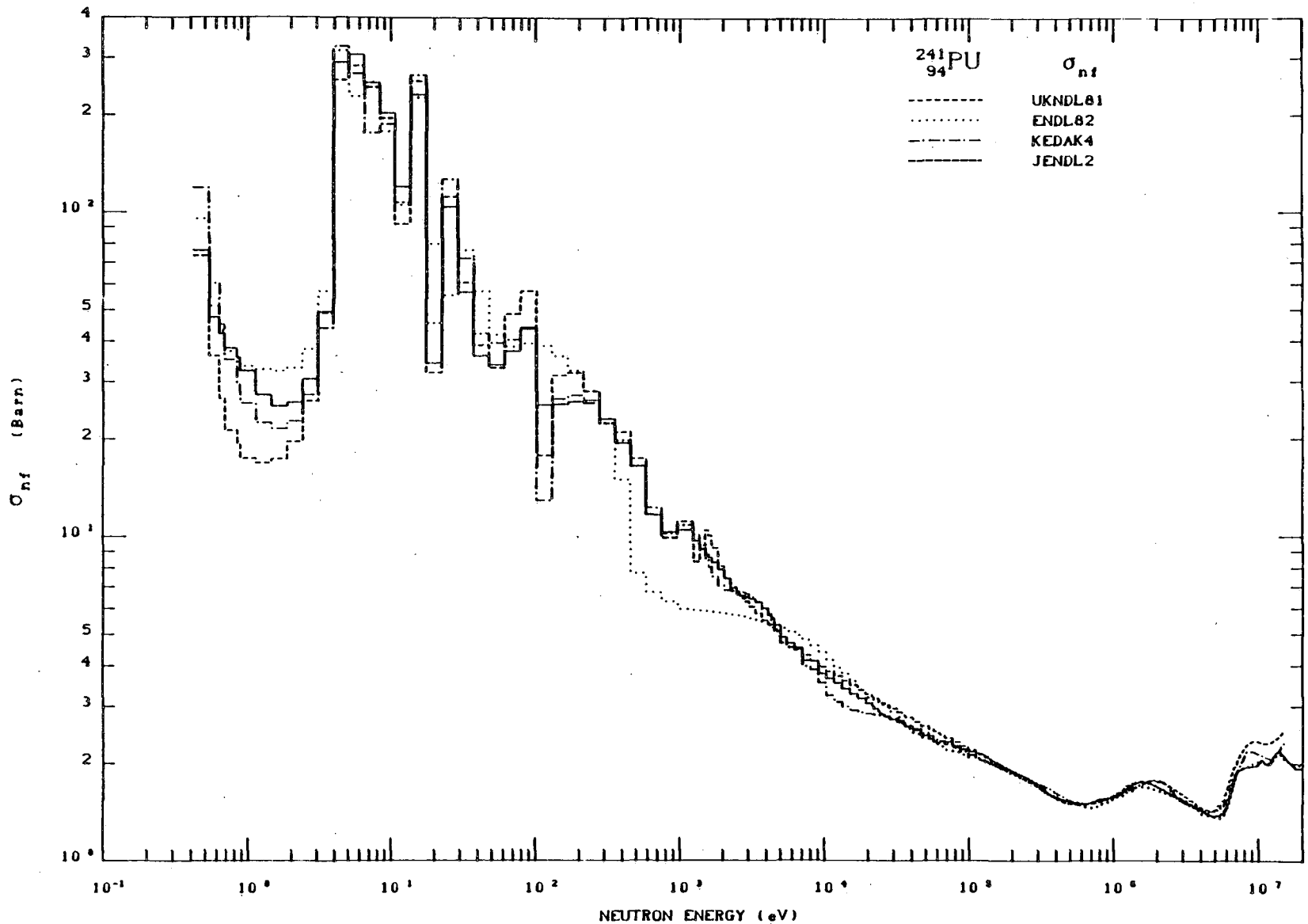
10^{-1}
10^{0}
10^{1}
10^{2}
10^{3}
10^{4}
10^{5}
10^{6}
10^{7}

$^{241}_{94}$Pu


$^{241}_{94}$PU
σ_{ng}
UKNDL81
ENDL82
KEDAK4
JENDL2
σ_{ng} (Barn)
NEUTRON ENERGY (eV)


$^{241}_{94}$PU
σ_{nf}
UKNDL81
ENDL82
KEDAK4
JENDL2
σ_{nf} (Barn)
NEUTRON ENERGY (eV)

$^{241}_{94}$Pu

^{242}Pu

NUCLEAR PROPERTIES

Spin and parity of ground state: 0^+

Ground state decay:

Alpha to ^{238}U: 100%, Q_α = 4.983 MeV

Half-life: 3.760 10^5 yr

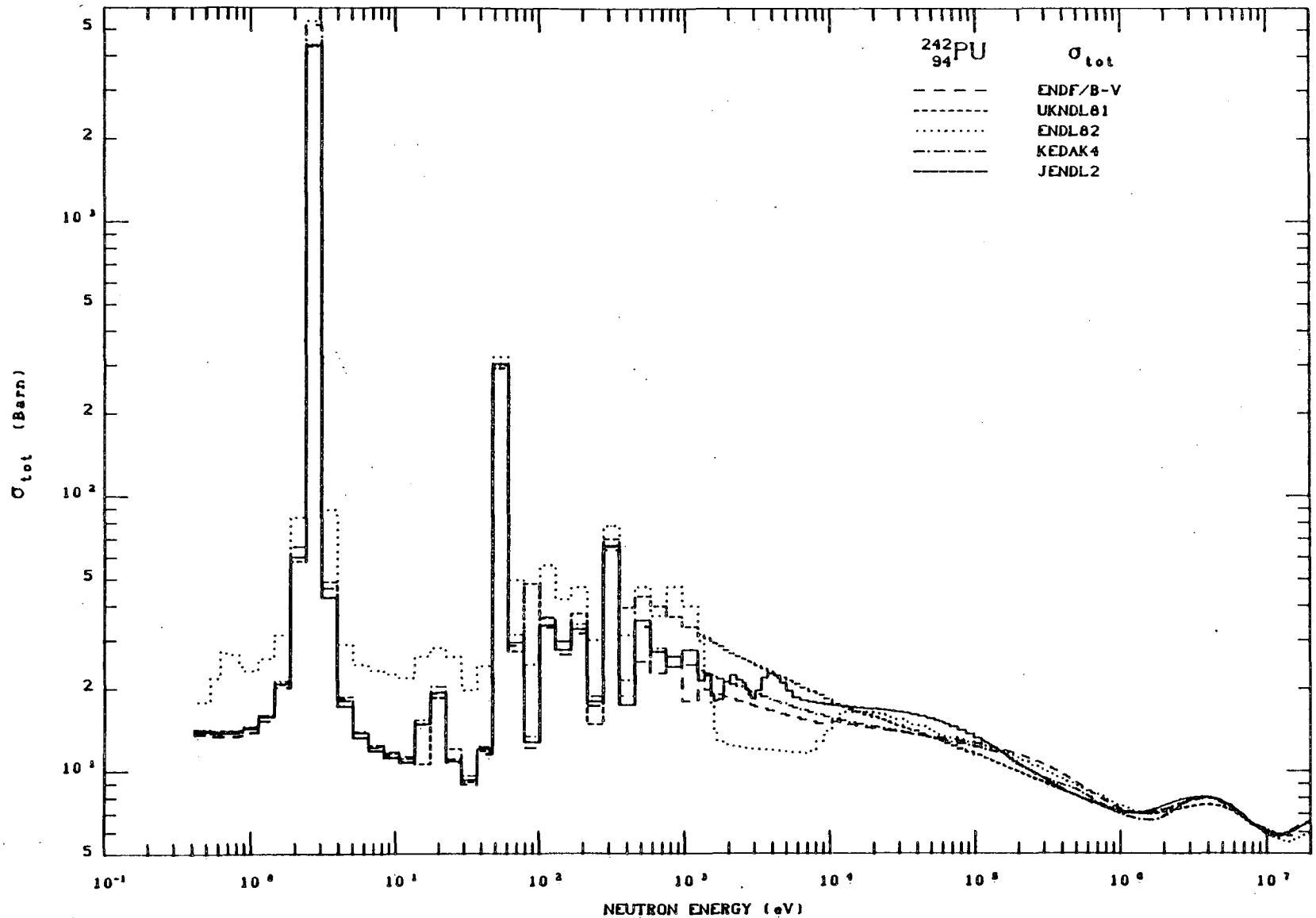
6.8 10^{10} yr - spontaneous fission

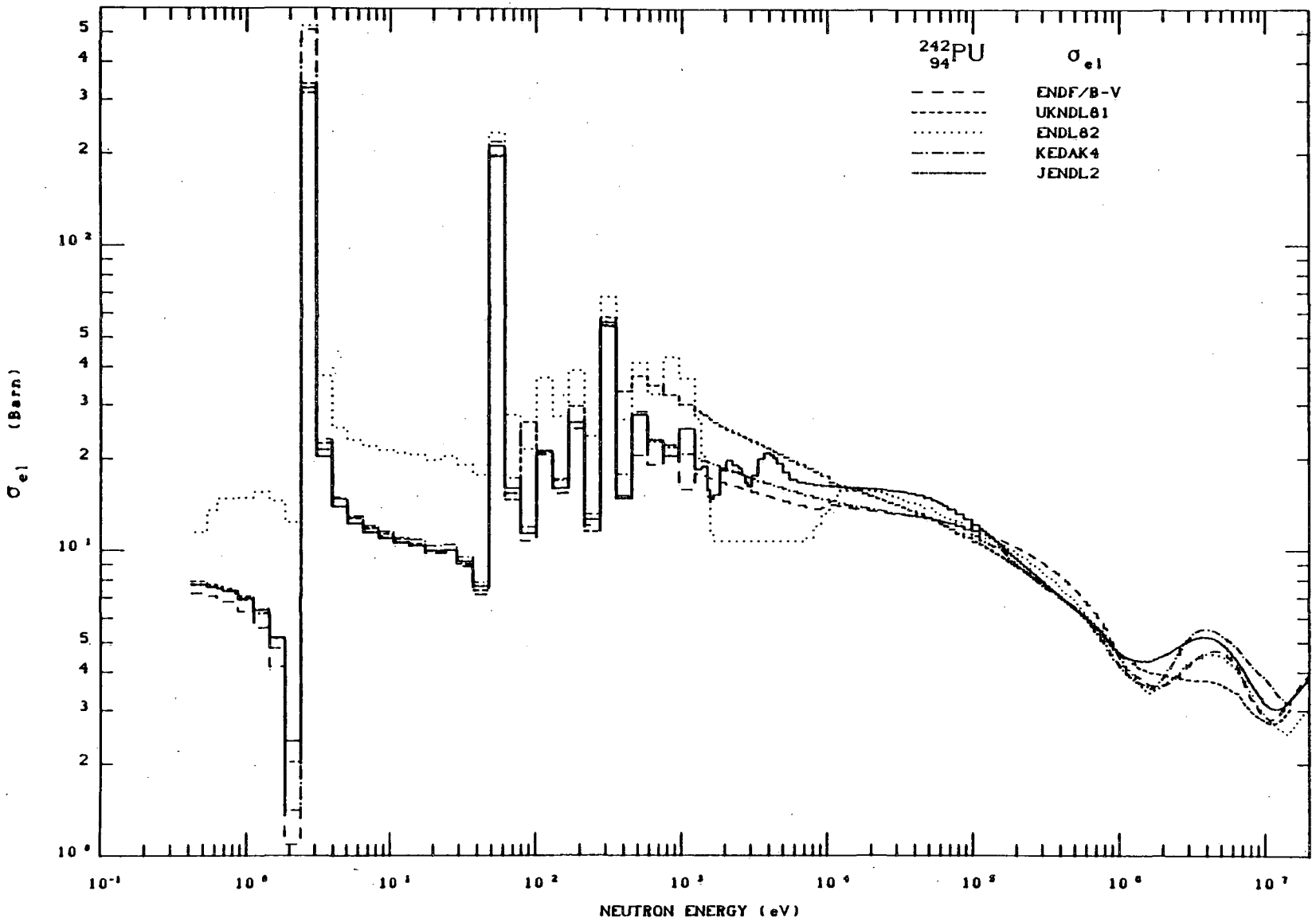
THERMAL CROSS SECTIONS (2200 m/s)

Reference	σ_γ	σ_f	σ_t	$\bar{\nu}_{sp}$	(barns)
ENDF/B - IV	18.5	0.0	26.9		
ENDF/B - V	19.17	$1.043 \cdot 10^{-3}$	26.90		
UKNDL -81	18.55		27.21		
ENDL -82	18.79	$884.5 \cdot 10^{-6}$	30.13		
KEDAK-4	18.95		27.26		
JENDL-2	18.42	0.1223	26.65		
70 CRC, DURHAM	18.7				
BNL 325 (1984)	18.5	<0.2	26.7	2.153	

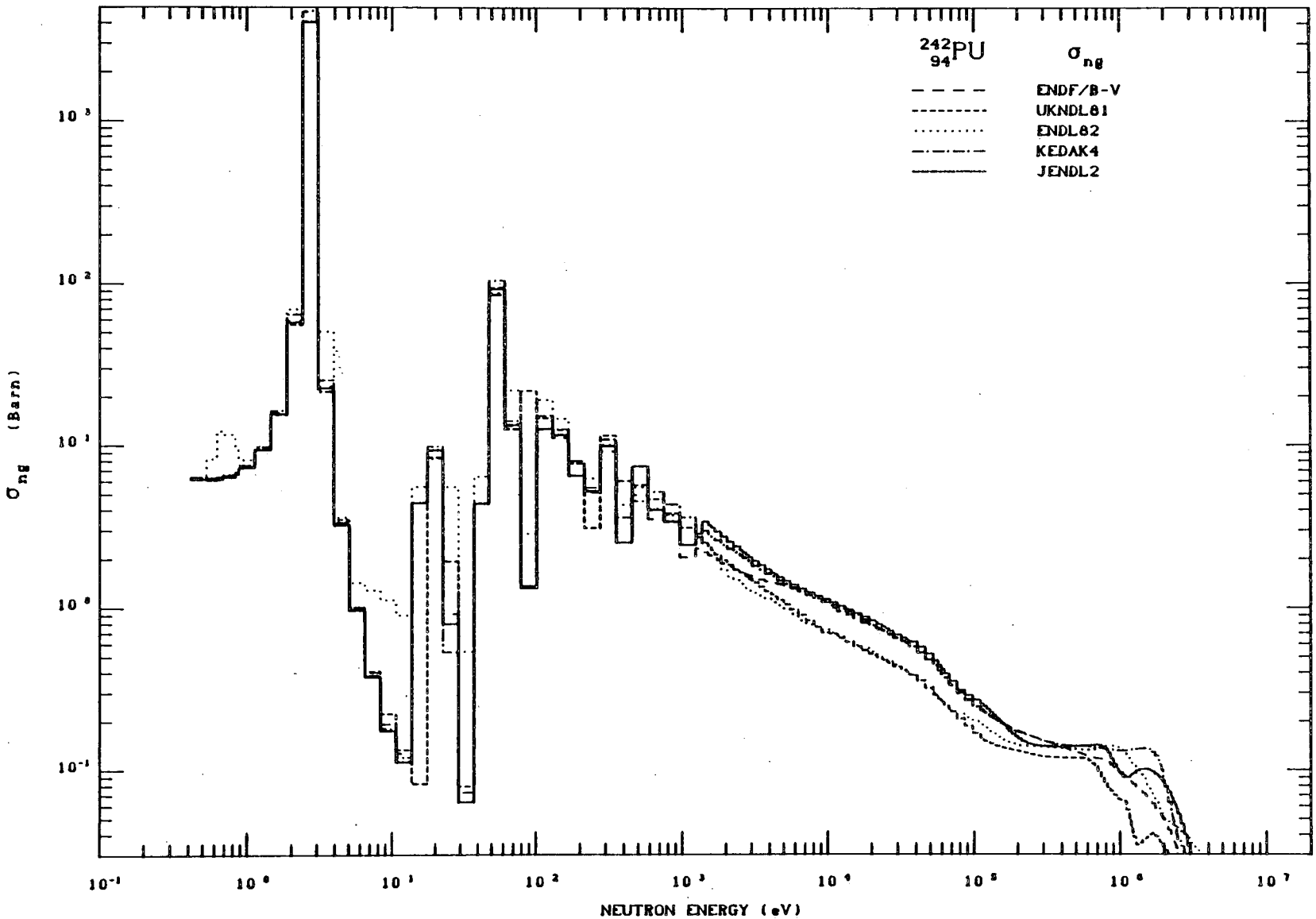
RESONANCE INTEGRALS

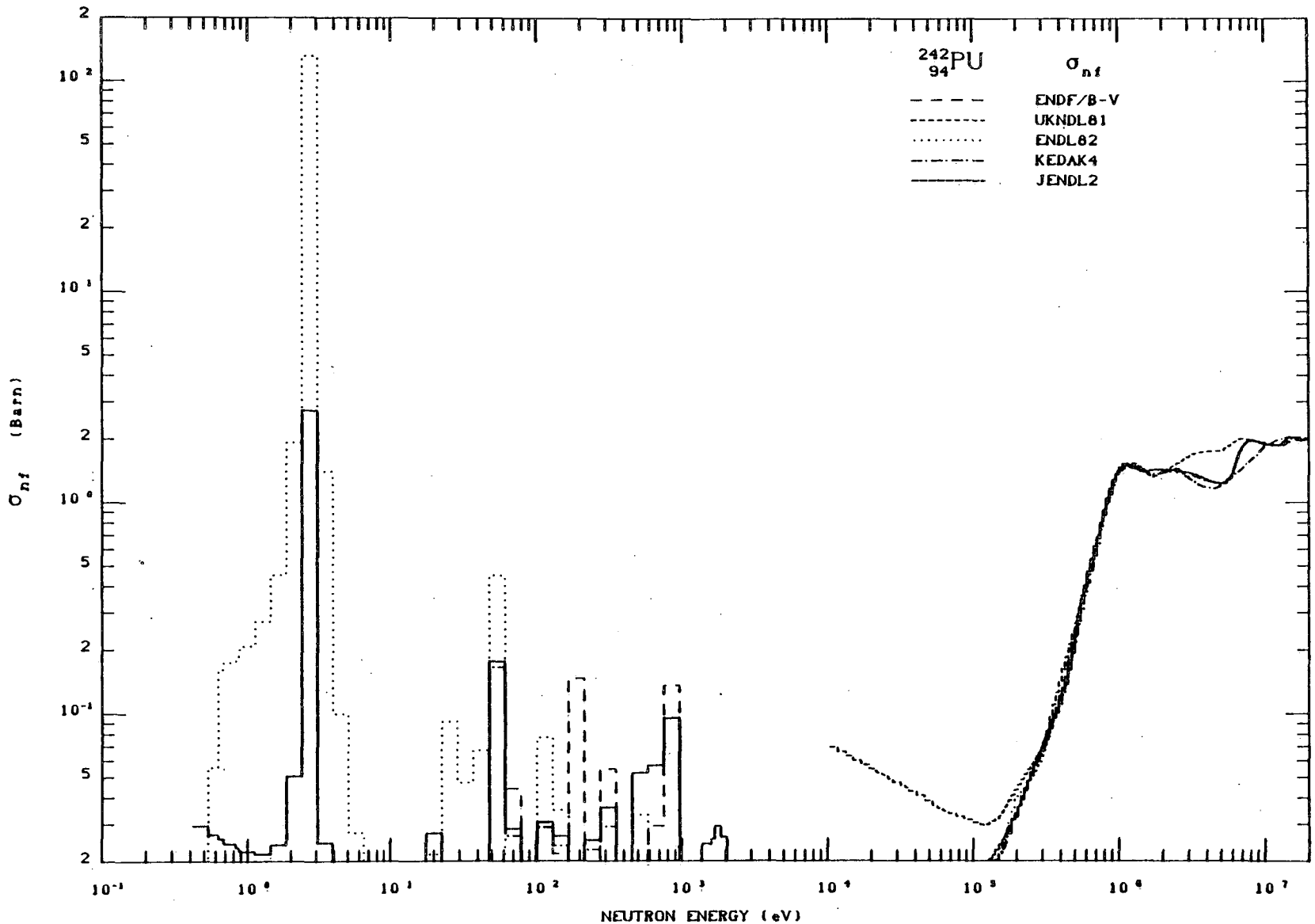
Reference	RI_γ	RI_f	(barns)
ENDF/B - IV	1122	0.08	
ENDF/B - V	1273	5.568	
UKNDL -81	1126	5.313	
ENDL -82	1302	39.95	
KEDAK-4	1125	4.689	
JENDL-2	1117	6.343	
70 MTR, YOUNG	1110		
BNL 325 (1984)	1115	5.0	


$^{242}_{94}$PU
σ_{tot}
ENDF/B-V
UKNDL81
ENDL82
KEDAK4
JENDL2
σ_{tot} (Barn)
NEUTRON ENERGY (eV)


$^{242}_{94}$PU
σ_{el}
ENDF/B-V
UKNDL81
ENDL82
KEDAK4
JENDL2
σ_{el} (Barn)
NEUTRON ENERGY (eV)

$^{242}_{94}$Pu


$^{242}_{94}$PU
σ_{ng}
ENDF/B-V
UKNDL81
ENDL82
KEDAK4
JENDL2
σ_{ng} (Barn)
NEUTRON ENERGY (eV)


$^{242}_{94}$PU
σ_{nf}
ENDF/B-V
UKNDL81
ENDL82
KEDAK4
JENDL2
σ_{nf} (Barn)
NEUTRON ENERGY (eV)

$^{242}_{94}$Pu

^{241}Am

NUCLEAR PROPERTIES

Spin and parity of ground state: $5/2^-$

Ground state decay:

Alpha to ^{237}Np: 100%, $Q_\alpha = 5.638$

Half-life: 432.2 yr

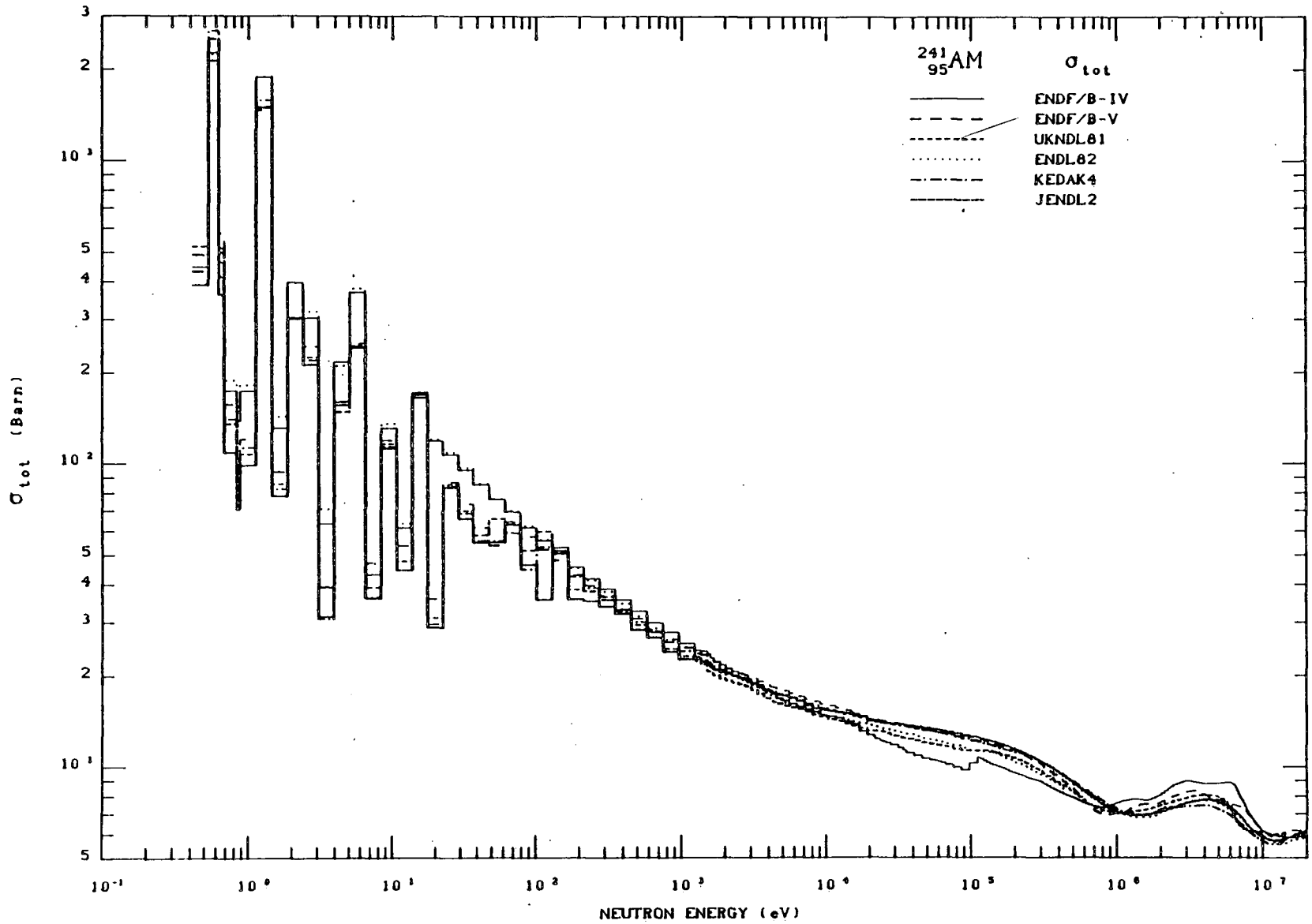
$1.15\ 10^{14}$ yr - spontaneous fission

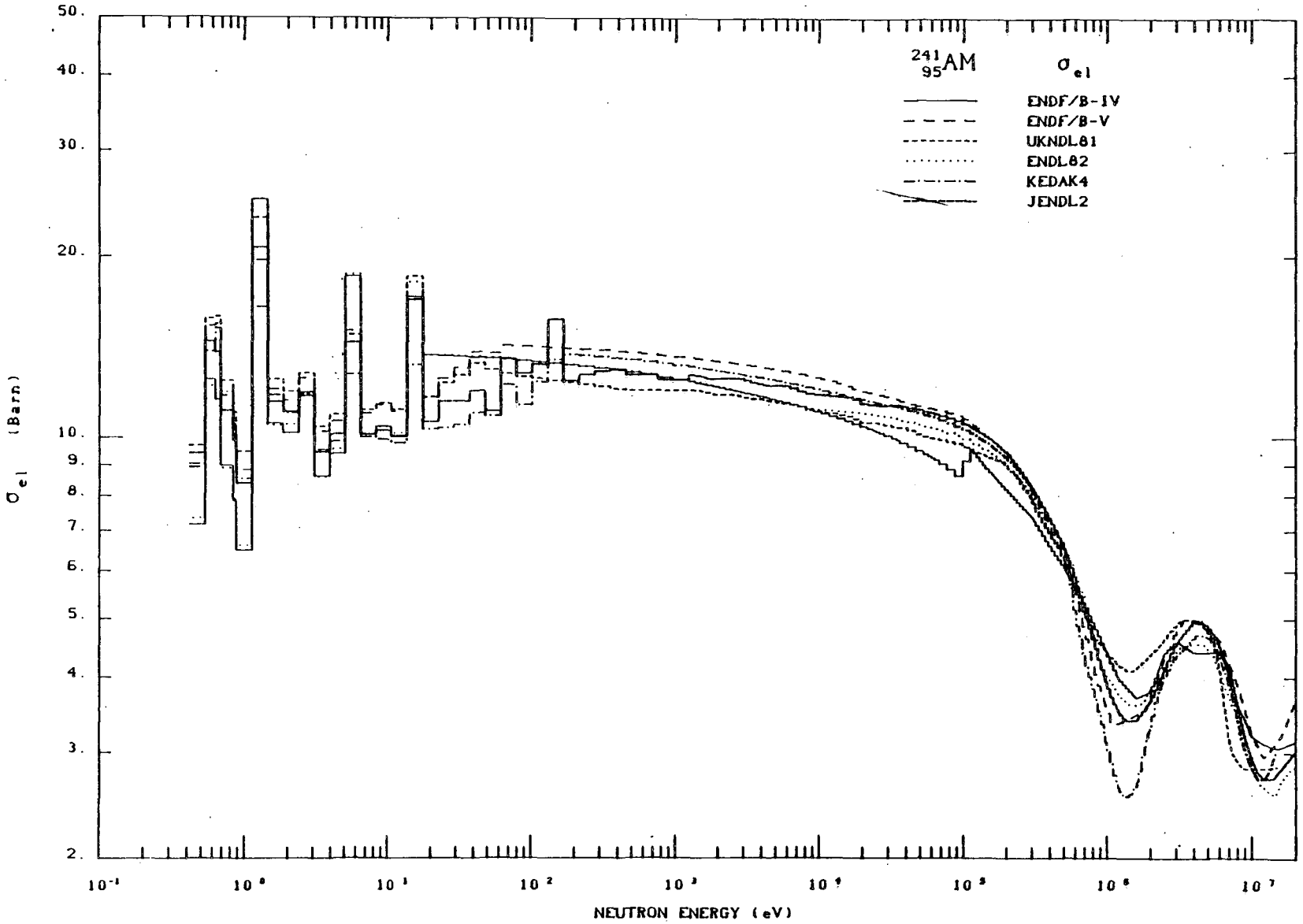
THERMAL CROSS SECTIONS (2200 m/s)

Reference	σ_γ	σ_f	σ_t	$\bar{\nu}_p$	(barns)
ENDF/B - IV	581.5	3.3	594.8		
ENDF/B - V	576.5	3.274	589.8	3.09	
UKNDL -81	600.0	3.100	615.0		
ENDL -82	583.9	3.282	600.5		
KEDAK-4	609.9	3.150	625.1		
JENDL-2	600.3	3.018	614.6		
BNL 325 (1984)	587	3.20		3.213	
BNL 325 (1984)(152 yr-^{242m}Am)	54				

RESONANCE INTEGRALS

Reference	RI_γ	RI_f	(barns)
ENDF/B - IV	1623	14.7	
ENDF/B - V	1424	13.43	
UKNDL -81	1417	15.03	
ENDL -82	1674	16.62	
KEDAK-4	1452	15.71	
JENDL-2	1299	14.69	
BNL 325 (1984)	1425	14.4	
BNL 325 (1984)(152 yr-^{242m}Am)	195		


$^{241}_{95}$AM
σ_{tot}
ENDF/B-IV
ENDF/B-V
UKNDL81
ENDL82
KEDAK4
JENDL2
σ_{tot} (Barn)
NEUTRON ENERGY (eV)


$^{241}_{95}$AM
σ_{el}
ENDF/B-IV
ENDF/B-V
UKNDL81
ENDL82
KEDAK4
JENDL2
σ_{el} (Barn)
NEUTRON ENERGY (eV)
50.
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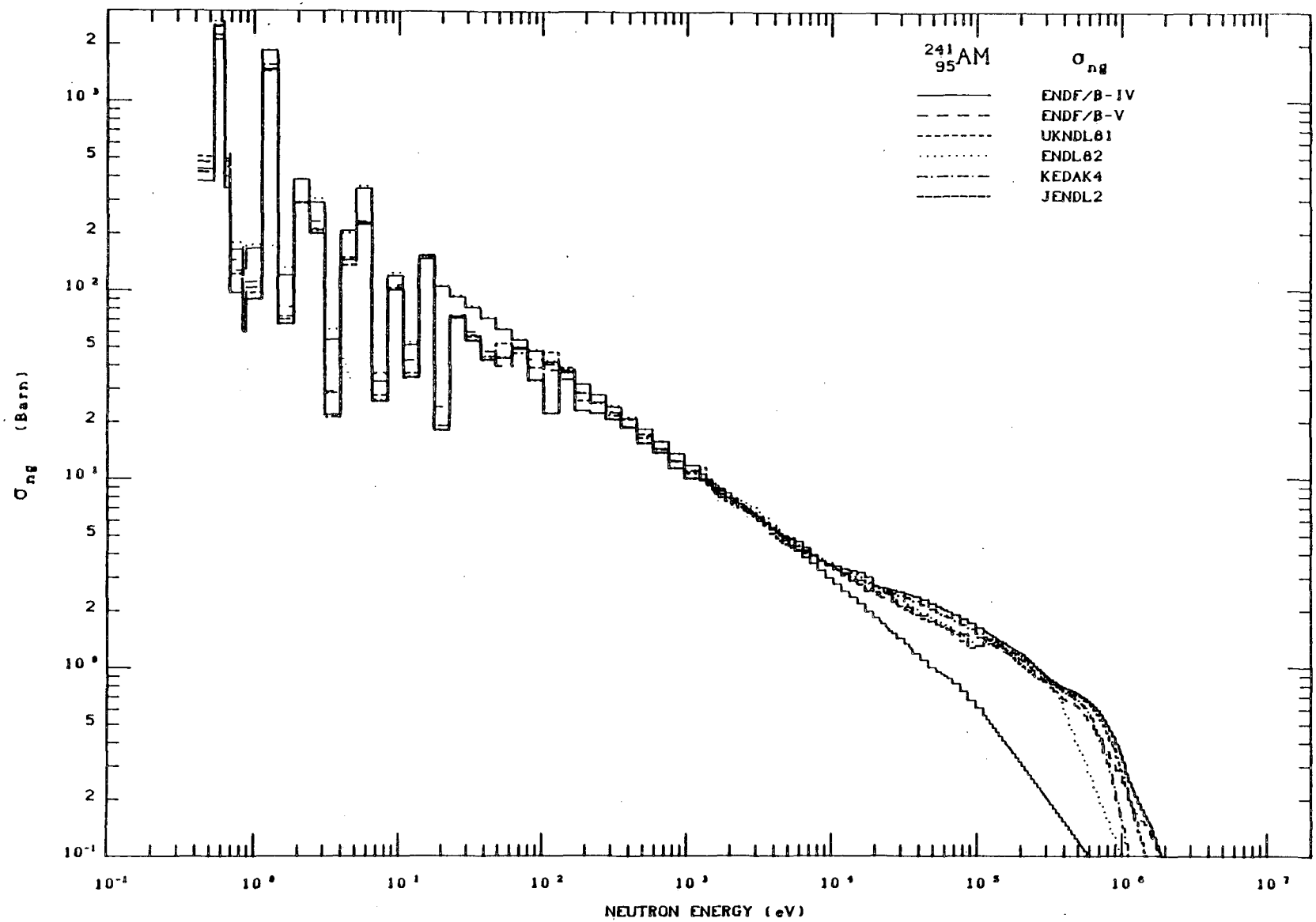
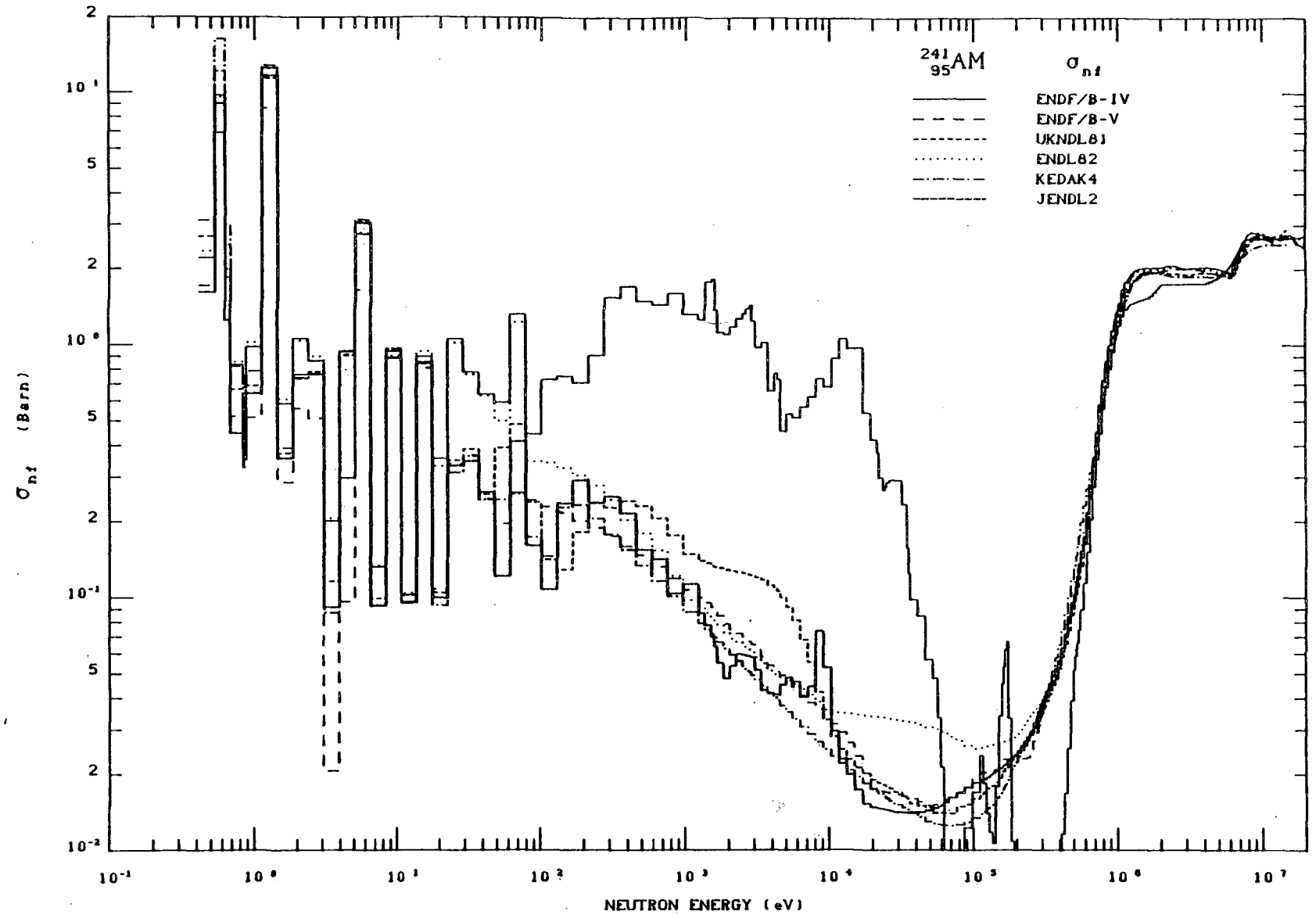
10^{6}
10^{7}


$^{241}_{95}$AM
σ_{ng}
ENDF/B-IV
ENDF/B-V
UKNDL81
ENDL82
KEDAK4
JENDL2
σ_{ng} (Barn)
NEUTRON ENERGY (eV)


$^{241}_{95}$AM
σ_{nf}
ENDF/B-IV
ENDF/B-V
UKNDL81
ENDL82
KEDAK4
JENDL2
σ_{nf} (Barn)
NEUTRON ENERGY (eV)

$^{241}_{95}$Am

^{242m}Am

NUCLEAR PROPERTIES

Spin and parity of metastable state: 5^-

Metastable state decay:

Gamma to ground state (IT): 99.5%, E_γ = 48.6 keV

Alpha to ^{238}Np: 0.5%

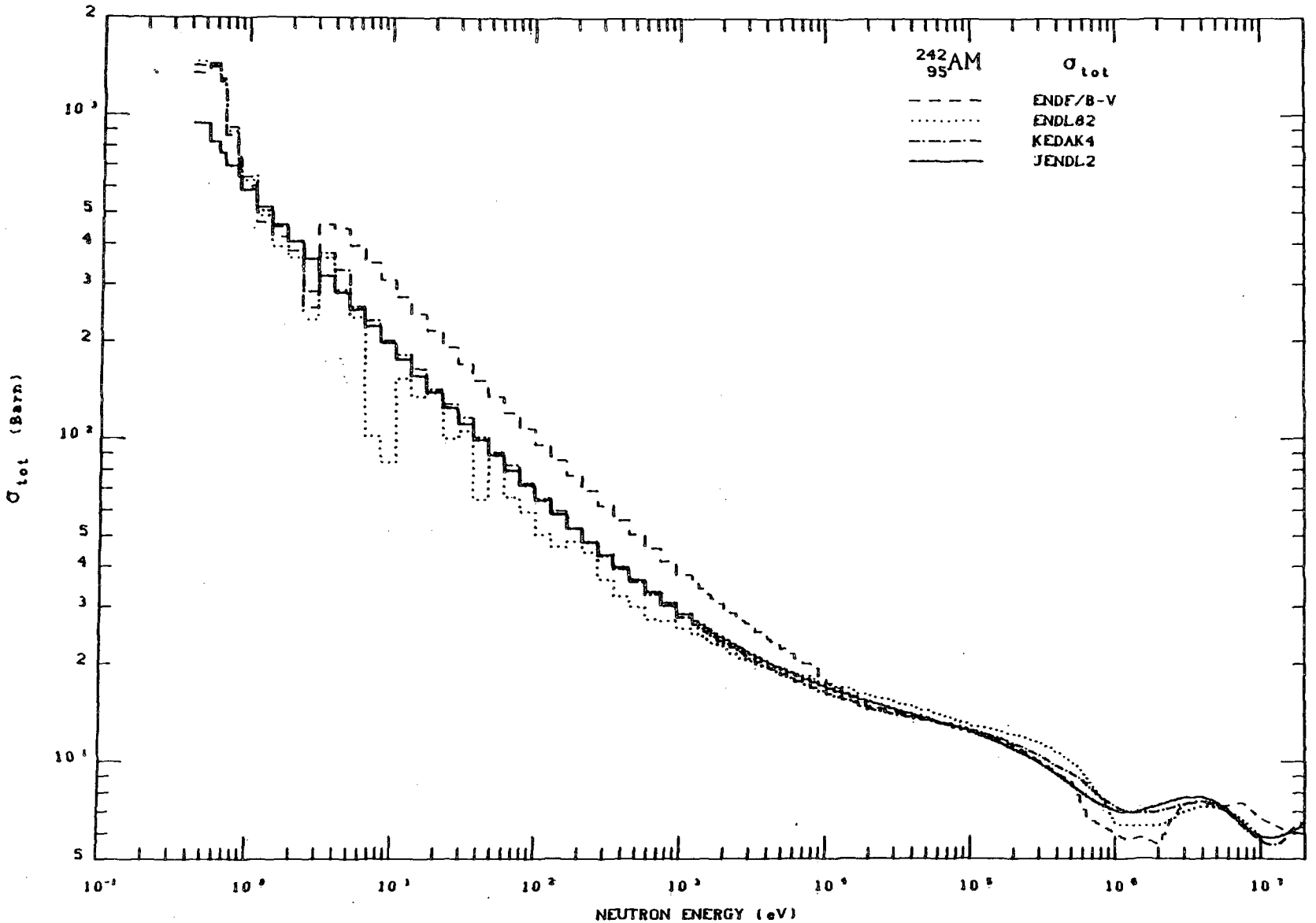
Half life: 152 yr

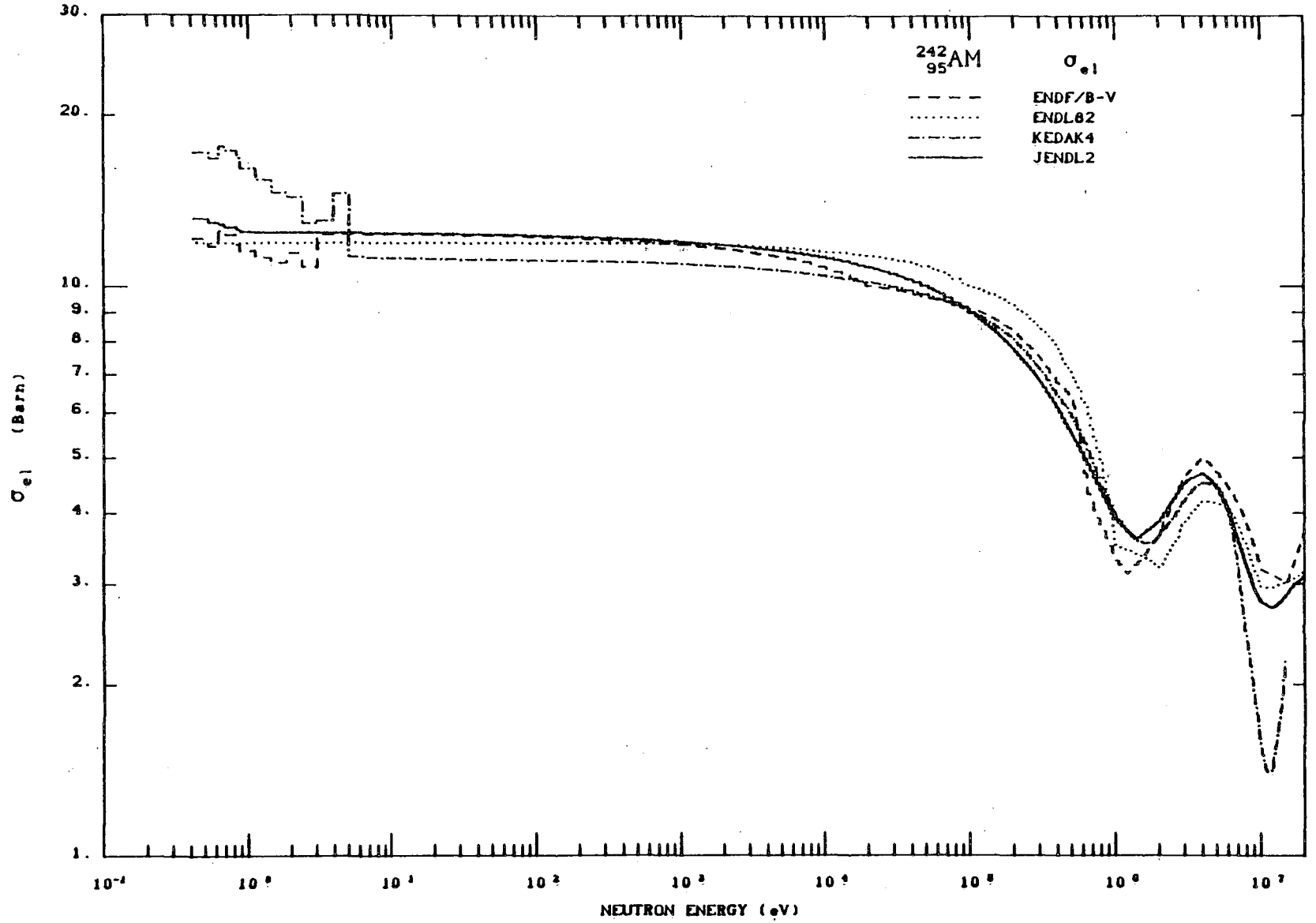
THERMAL CROSS SECTIONS (2200 m/s)

Reference	σ_γ	σ_f	σ_t	$\bar{\nu}_p$	(barns)
ENDF/B - V	1344	6625	7974		
ENDL -82	1994	6328	8335		
KEDAK-4	1400	6840	8250		
JENDL-2	1342	6620	7969		
BNL 325 (1984)		6950		3.260	

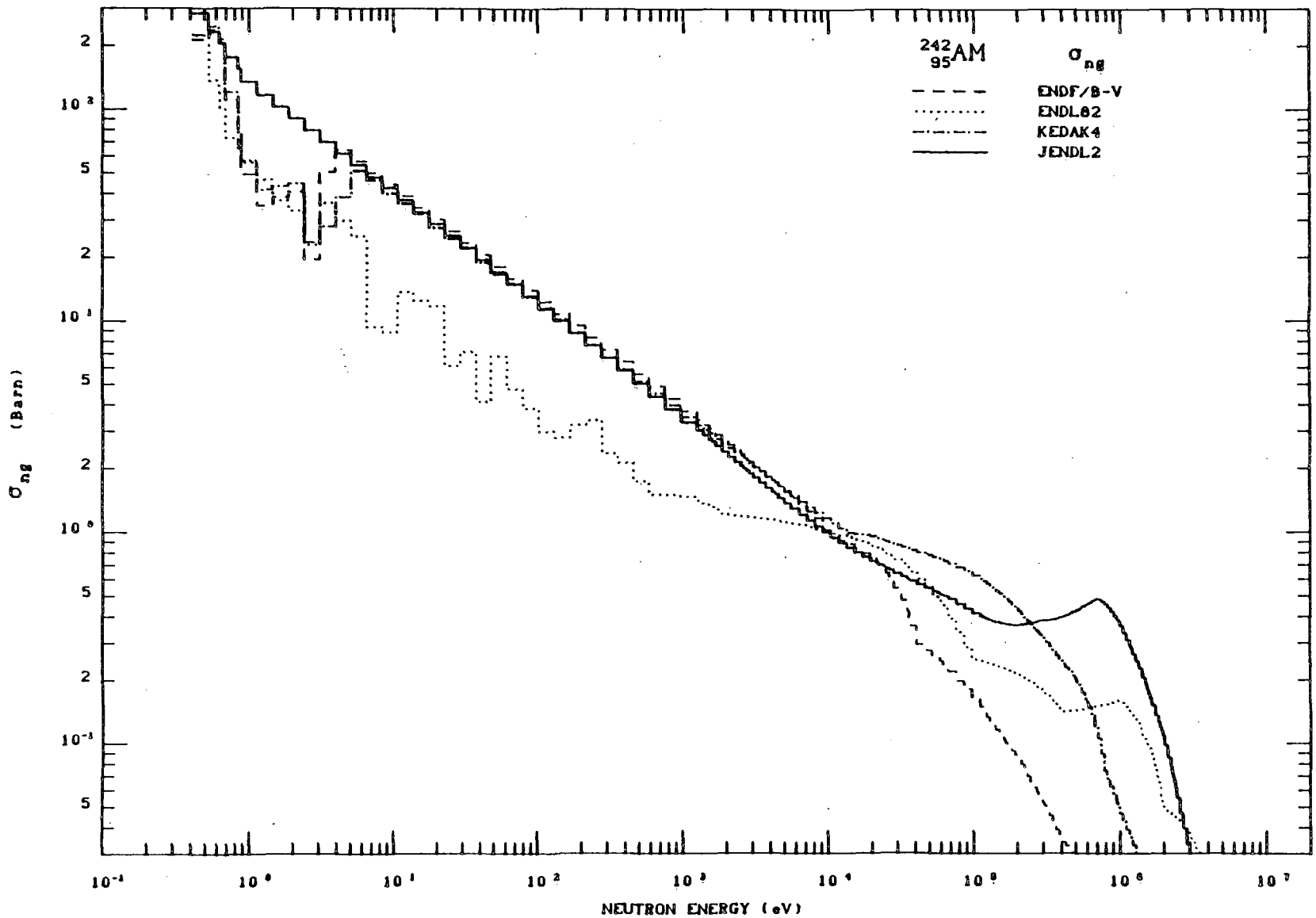
RESONANCE INTEGRALS

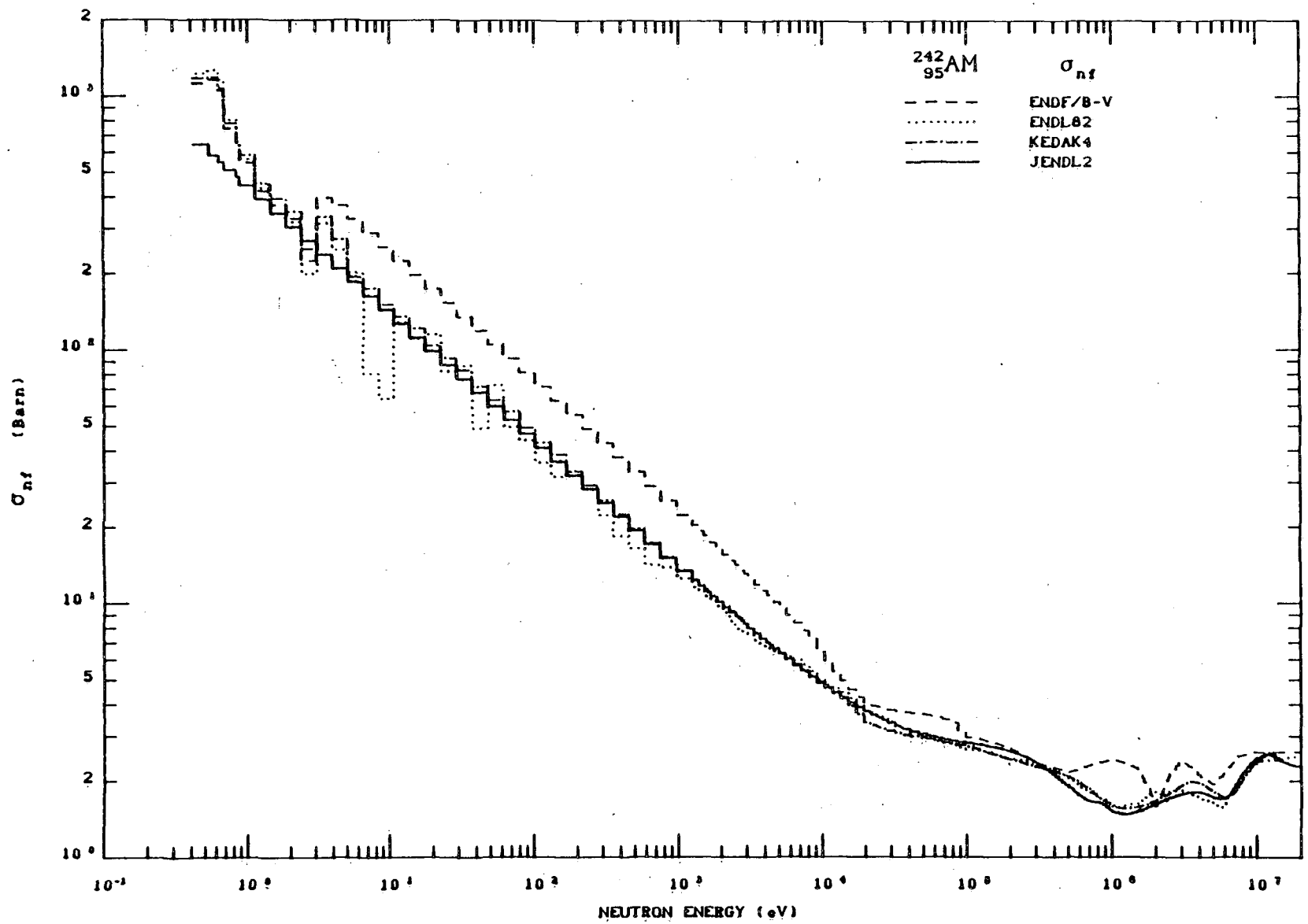
Reference	RI_γ	RI_f	(barns)
ENDF/B - V	286.3	1883	
ENDL -82	164.4	1542	
KEDAK-4	279.7	1630	
JENDL-2	206.8	1528	
BNL 325 (1984)		1800	


$^{242}_{95}AM$
σ_{tot}
ENDF/B-V
ENDL82
KEDAK4
JENDL2
σ_{tot} (Barn)
NEUTRON ENERGY (eV)


$^{242}_{95}$AM
σ_{el}
ENDF/B-V
ENDL82
KEDAK4
JENDL2
σ_{el} (Barn)
NEUTRON ENERGY (eV)

$^{242m}_{95}$Am


$^{242}_{95}AM$
σ_{ng}
ENDF/B-V
ENDL82
KEDAK4
JENDL2
σ_{ng} (Barn)
NEUTRON ENERGY (eV)


$^{242}_{95}$AM
σ_{nf}
ENDF/B-V
ENDL82
KEDAK4
JENDL2
σ_{nf} (Barn)
NEUTRON ENERGY (eV)

$^{242m}_{95}$Am

^{243}Am

NUCLEAR PROPERTIES

Spin and parity of ground state: $5/2^-$

Ground state decay:

Alpha to ^{231}Np: 100%, Q_α = 5.439 MeV

Half-life: 7.38 10^3 yr

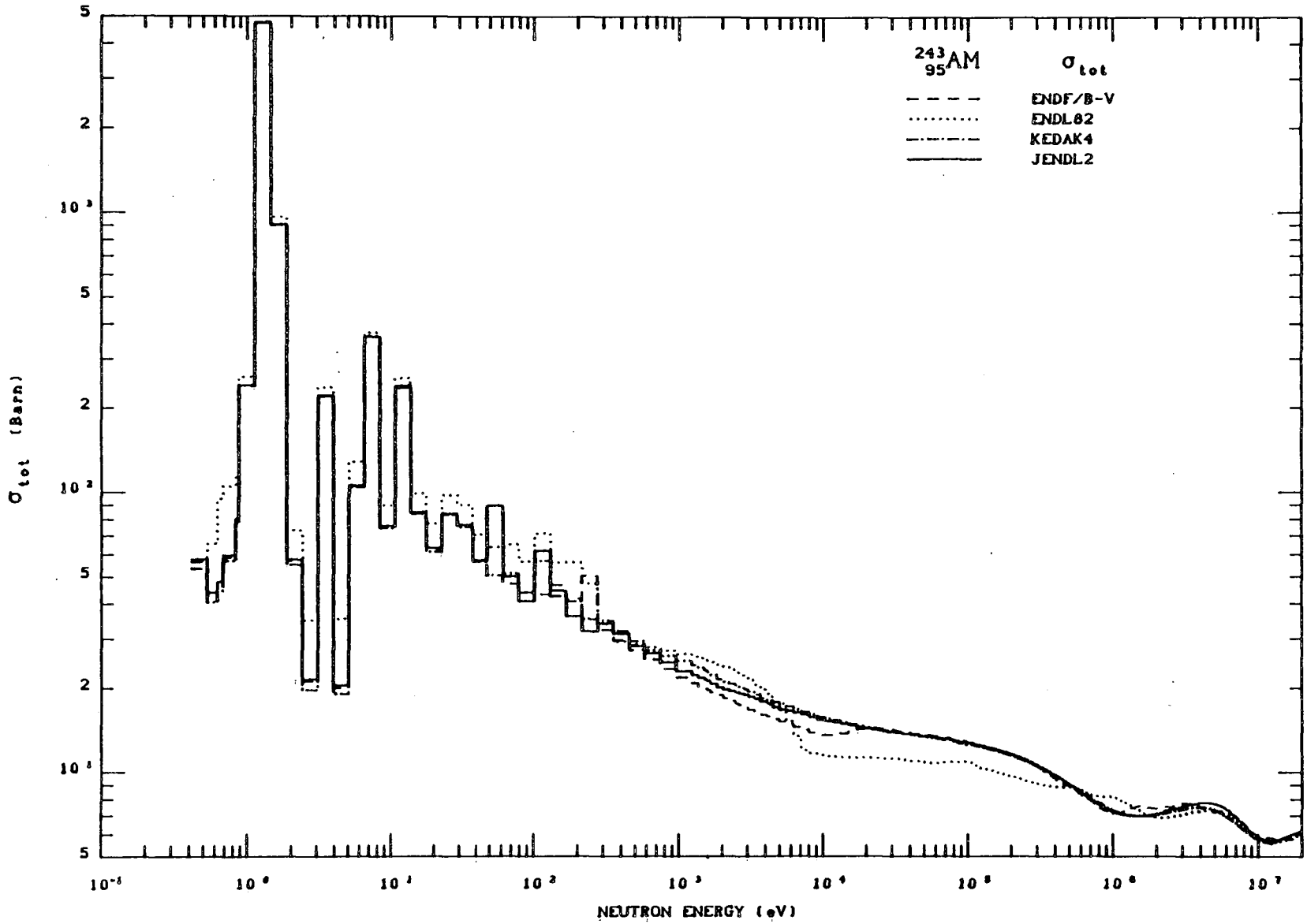
2 10^{14} yr - spontaneous fission

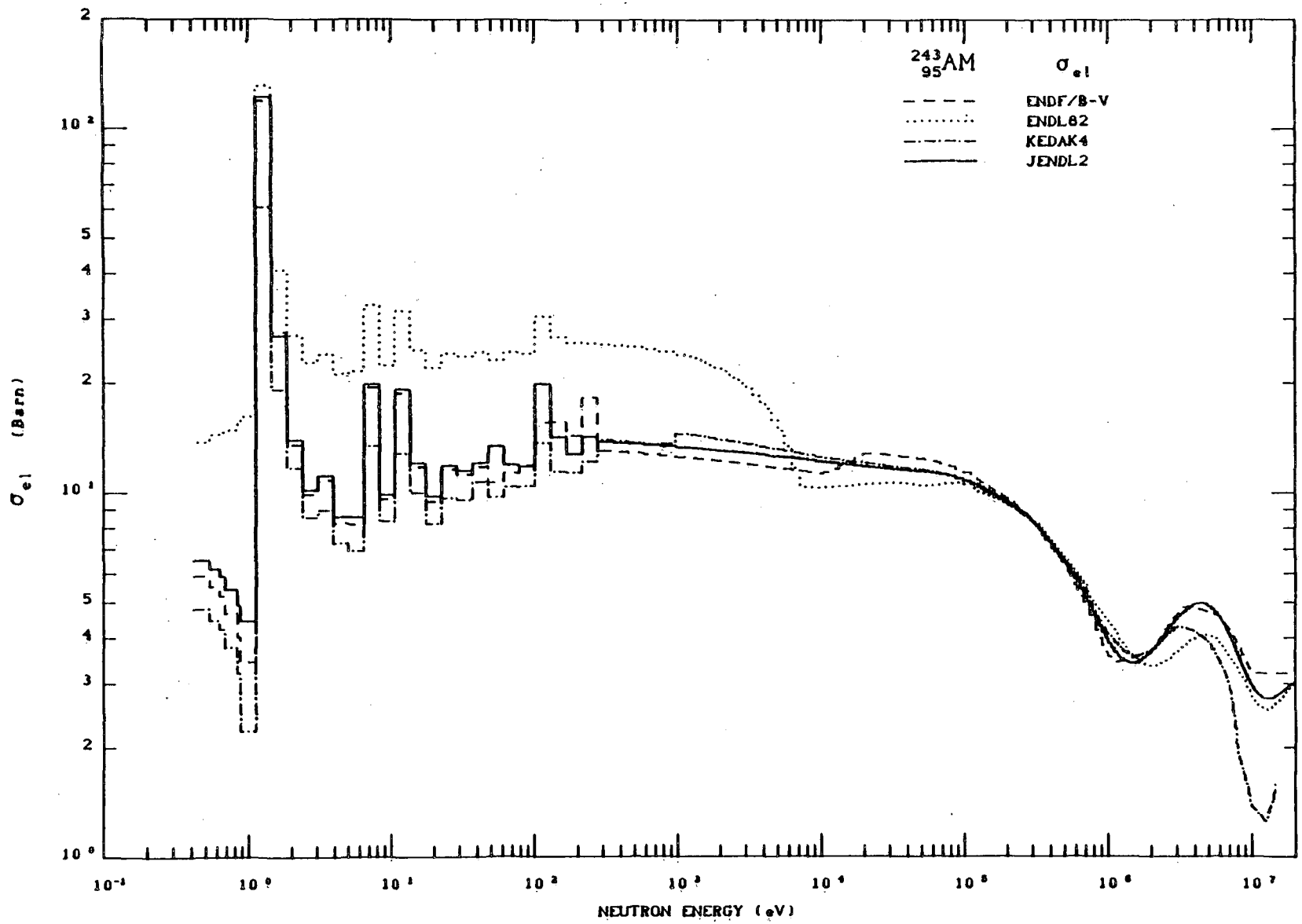
THERMAL CROSS SECTIONS (2200 m/s)

Reference	σ_γ	σ_f	σ_t	$\bar{\nu}_p$	(barns)
ENDF/B - IV	122.3	0.0			
ENDF/B - V	74.77		81.74		
UKNDL -81	77.00	0.050	84.18		
ENDL -82	74.62	0.8939	86.86		
KEDAK-4	74.74	3.011 10^{-3}	80.41		
JENDL-2	78.50	0.2290	86.26		
BNL 325 (1984)	75.1		84.0	3.214	
BNL 325 (1984)(10.1 hr-^{244g}Am)	3.8				

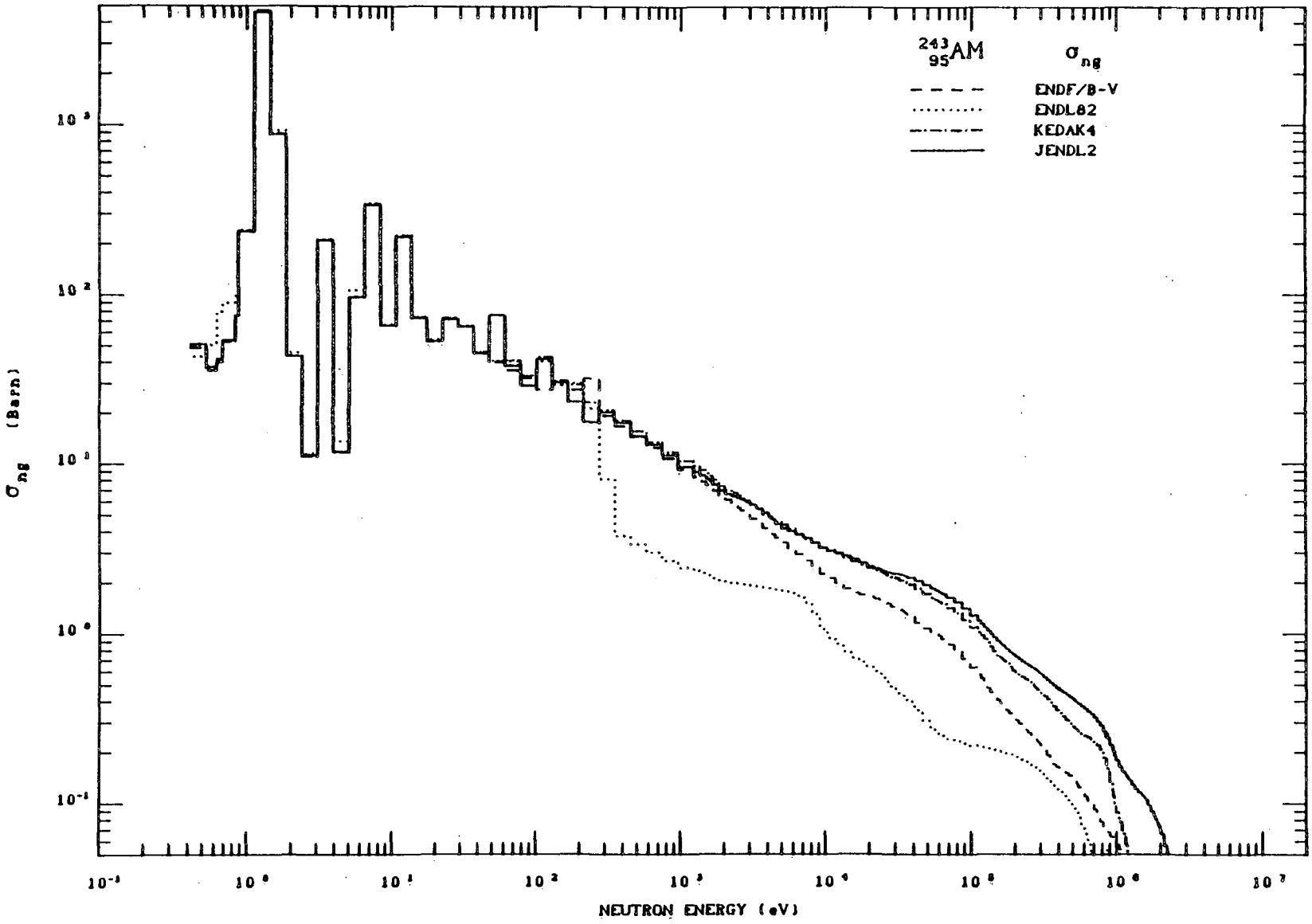
RESONANCE INTEGRALS

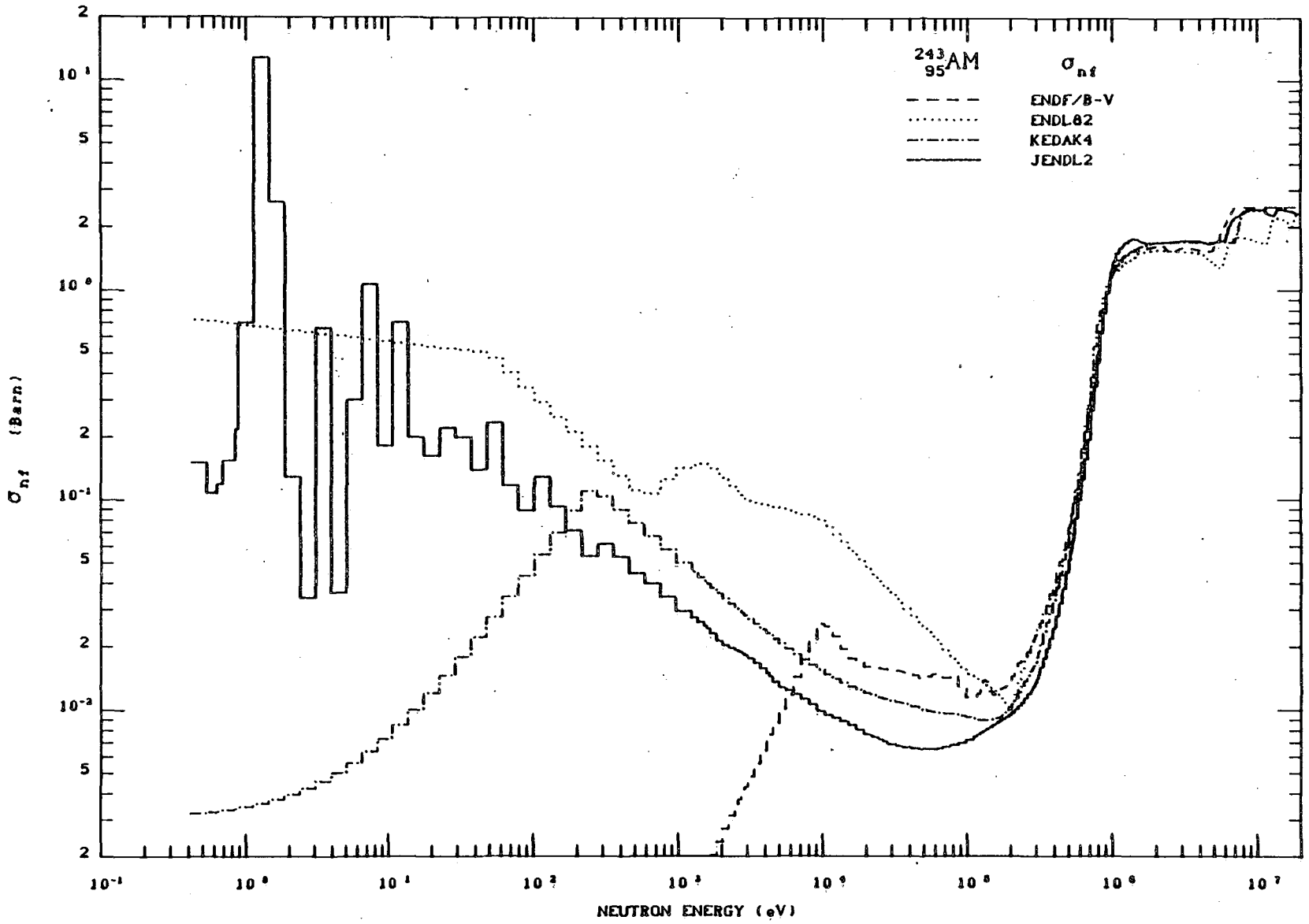
Reference	RI_γ	RI_f	(barns)
ENDF/B - IV	1235	0.0	
ENDF/B - V	1818	6.151	
UKNDL -81	1850	5.957	
ENDL -82	1822	9.018	
KEDAK-4	1848	5.694	
JENDL-2	1818	11.37	
BNL 325 (1984)	1820	9	
BNL 325 (1984)(10.1 hr-^{244g}Am)	94		


$^{243}_{95}$AM
σ_{tot}
ENDF/B-V
ENDL82
KEDAK4
JENDL2
σ_{tot} (Barn)
NEUTRON ENERGY (eV)


$^{243}_{95}$AM
σ_{el}
ENDF/B-V
ENDL82
KEDAK4
JENDL2
σ_{el} (Barn)
NEUTRON ENERGY (eV)

$^{243}_{95}$Am


$^{243}_{95}$AM
σ_{ng}
ENDF/B-V
ENDL82
KEDAK4
JENDL2
σ_{ng} (Barn)
NEUTRON ENERGY (eV)


$^{243}_{95}$AM
σ_{nf}
ENDF/B-V
ENDL82
KEDAK4
JENDL2
σ_{nf} (Barn)
NEUTRON ENERGY (eV)

$^{243}_{95}$Am

^{242}Cm

NUCLEAR PROPERTIES

Spin and parity of ground state: 0^+

Ground state decay:

Alpha to ^{238}Pu

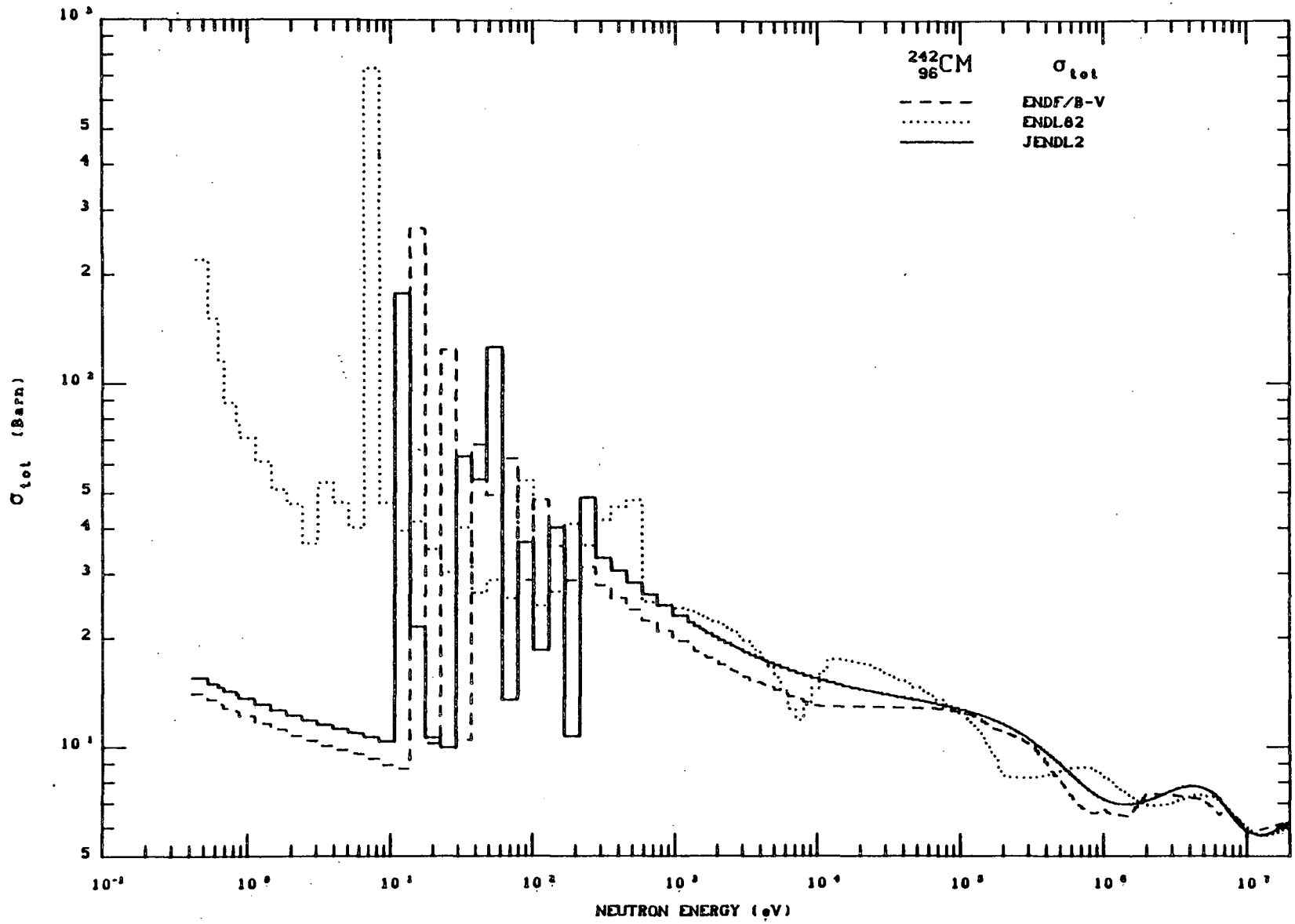
Half-life: 162.8 d

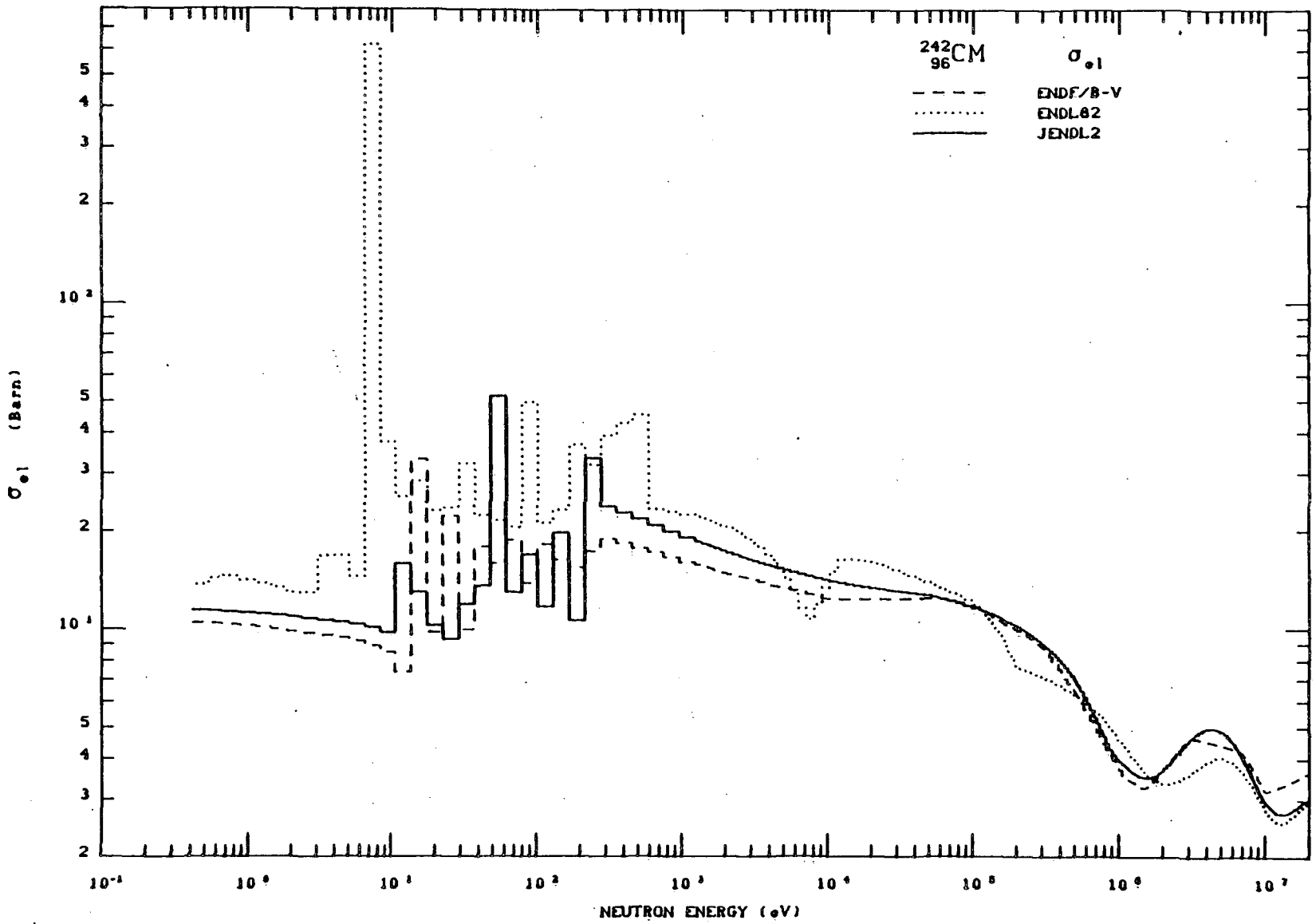
THERMAL CROSS SECTIONS (2200 m/s)

Reference	σ_γ	σ_f	σ_t	$\bar{\nu}_{sp}$	(barns)
ENDL -82	16.00	5.010	32.35		
JENDL-2	15.92	5.000	32.53		
BNL 325 (1984)	16	<5		2.538	

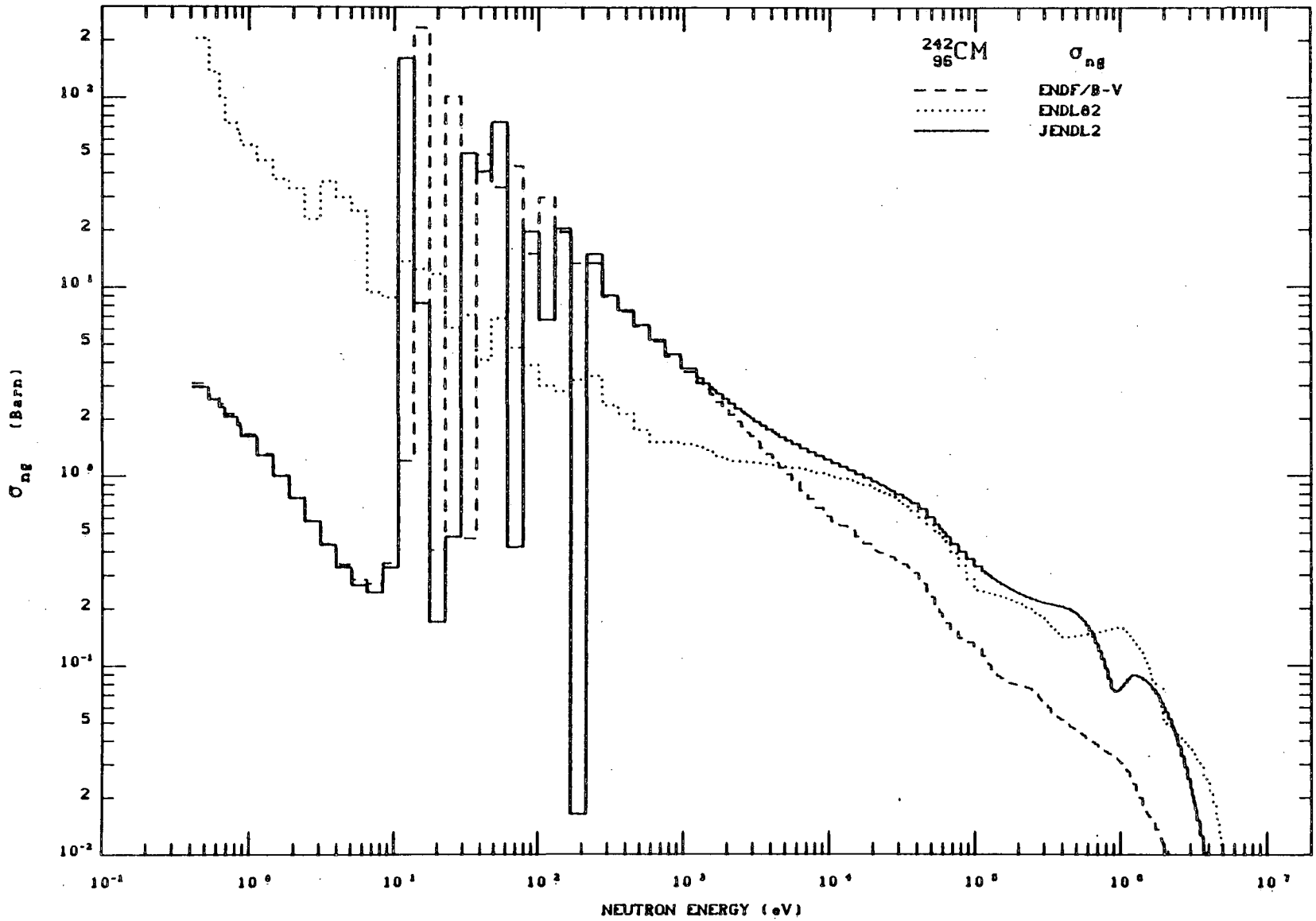
RESONANCE INTEGRALS

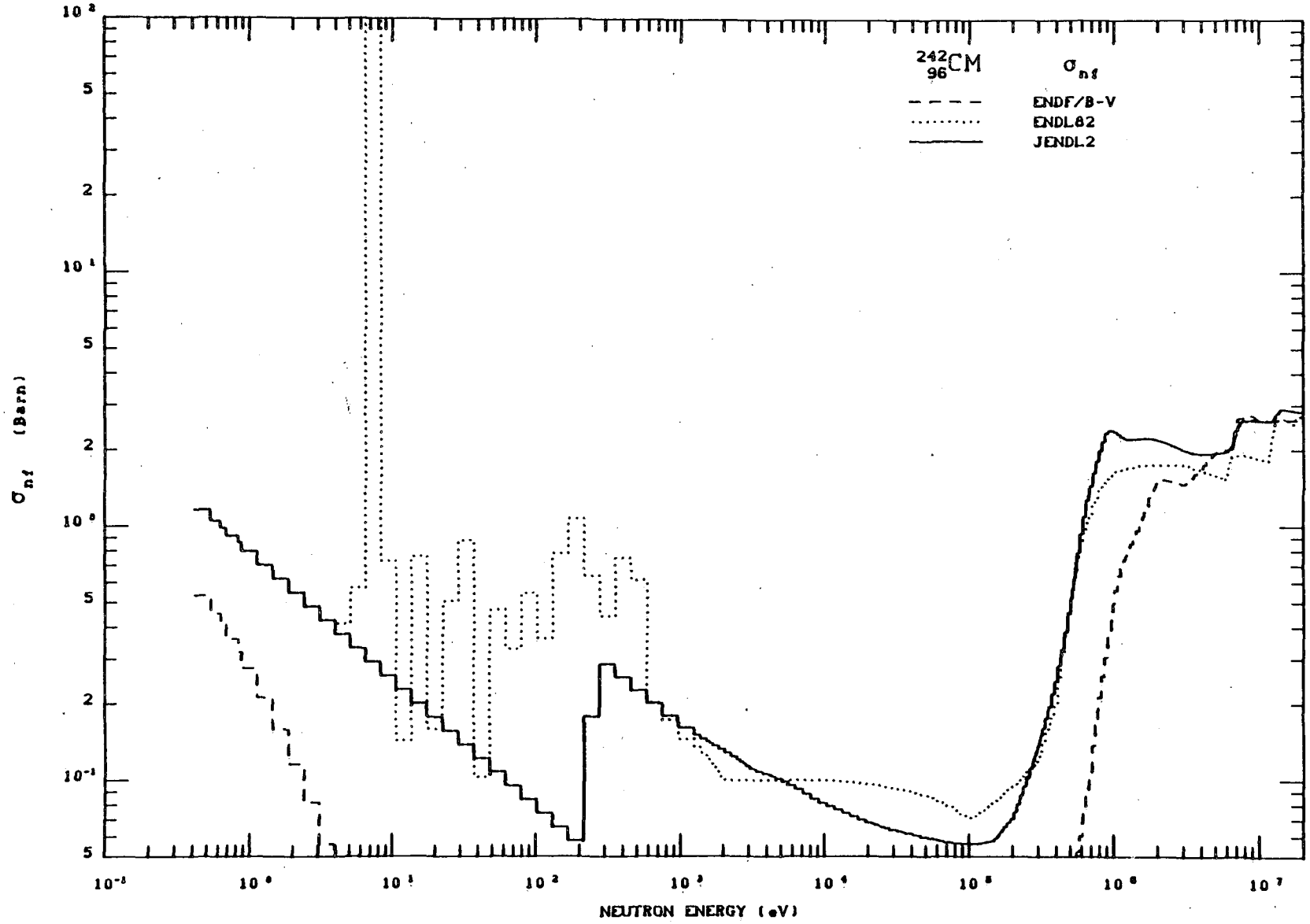
Reference	RI_γ	RI_f	(barns)
ENDL -82	164.4	36.37	
JENDL-2	116.2	11.10	
BNL 325 (1984)	110		


$^{242}_{96}$CM
σ_{tot}
ENDF/B-V
ENDL82
JENDL2
σ_{tot} (Barn)
NEUTRON ENERGY (eV)


$^{242}_{96}$CM
σ_{el}
ENDF/B-V
ENDL82
JENDL2
σ_{el} (Barn)
NEUTRON ENERGY (eV)

$^{242}_{96}$Cm


$^{242}_{96}$CM
σ_{ng}
ENDF/B-V
ENDL82
JENDL2
σ_{ng} (Barn)
NEUTRON ENERGY (eV)


$^{242}_{96}$CM
σ_{nf}
ENDF/B-V
ENDL82
JENDL2
σ_{nf} (Barn)
NEUTRON ENERGY (eV)

$^{242}_{96}$Cm

^{243}Cm

NUCLEAR PROPERTIES

Spin and parity of ground state: $5/2^+$

Ground state decay:

Alpha to ^{239}Pu: 99.7%

Beta (β^+) to ^{243}Am: 0.26%

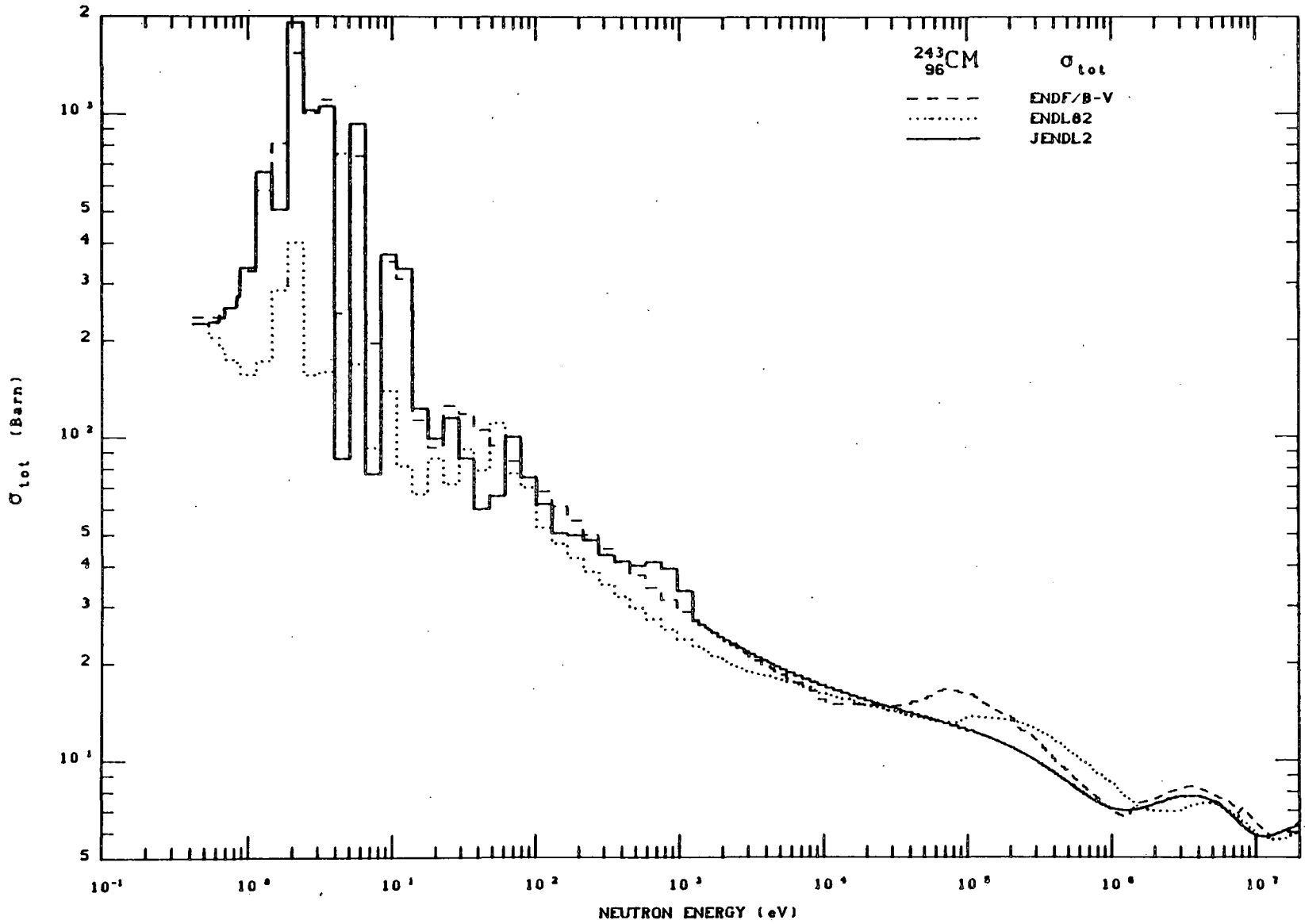
Half-life: 28.5 yr

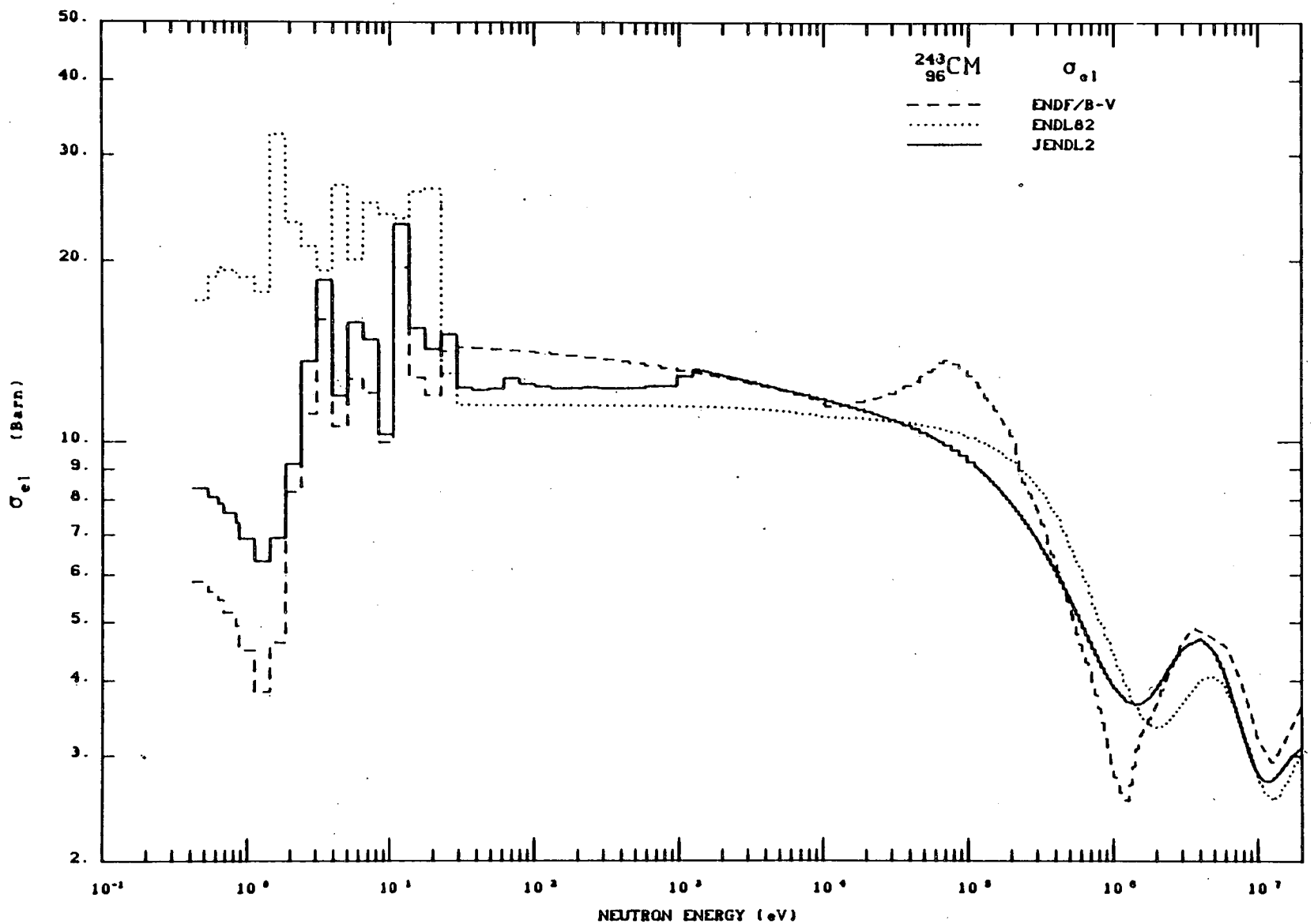
THERMAL CROSS SECTIONS (2200 m/s)

Reference	σ_γ	σ_f	σ_t	$\bar{\nu}_p$	(barns)
ENDF/B - V	58.03	691.5	756.2		
ENDL -82	391.1	690.8	1093		
JENDL-2	131.3	612.3	753.3	3.43	
BNL 325 (1984)	130	617		3.430	

RESONANCE INTEGRALS

Reference	RI_γ	RI_f	(barns)
ENDF/B - V	248.4	1952	
ENDL -82	121.4	777.2	
JENDL-2	404.4	1751	
BNL 325 (1984)	215	1570	


$^{243}_{96}$CM
σ_{tot}
ENDF/B-V
ENDL82
JENDL2
σ_{tot} (Barn)
NEUTRON ENERGY (eV)


$^{243}_{96}$CM
σ_{el}
ENDF/B-V
ENDL82
JENDL2
σ_{el} (Barn)
NEUTRON ENERGY (eV)
50.
40.
30.
20.
10.
9.
8.
7.
6.
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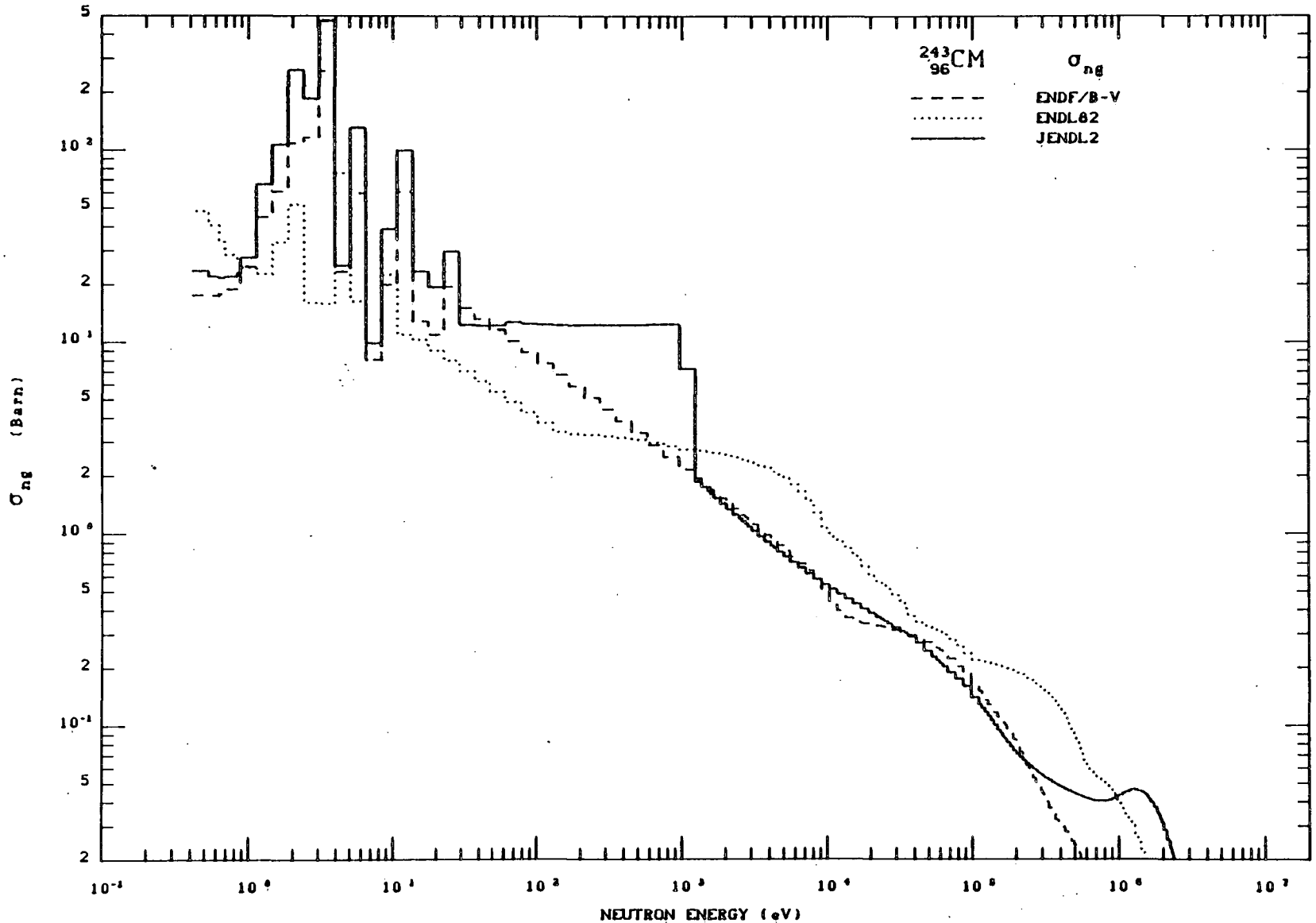
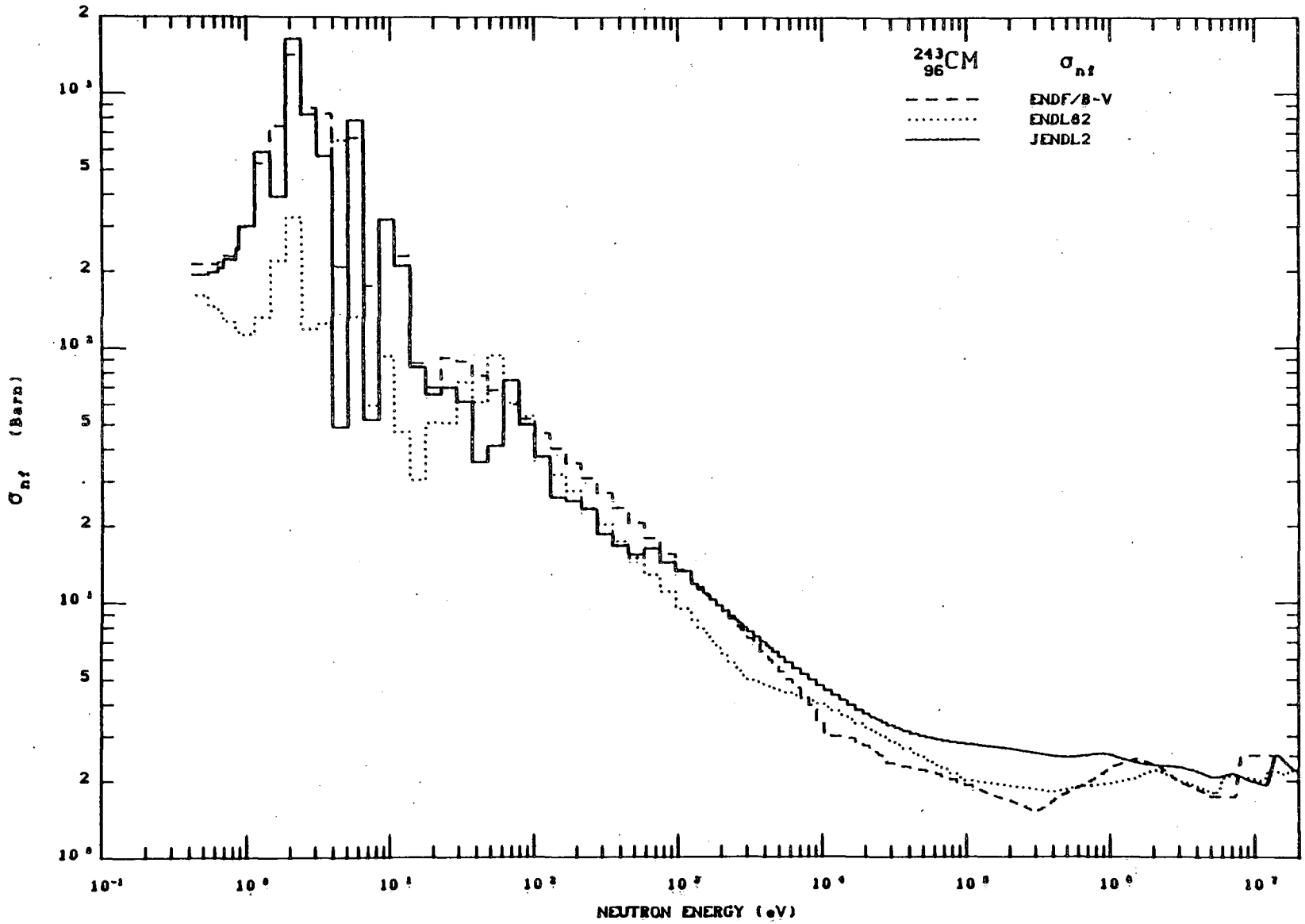
3.
2.
10^{-1}
10^{0}
10^{1}
10^{2}
10^{3}
10^{4}
10^{5}
10^{6}
10^{7}


$^{243}_{96}$CM
σ_{ng}
ENDF/B-V
ENDL82
JENDL2
σ_{ng} (Barn)
NEUTRON ENERGY (eV)


$^{243}_{96}$CM
σ_{nf}
ENDF/B-V
ENDL82
JENDL2
σ_{nf} (Barn)
NEUTRON ENERGY (eV)

$^{243}_{96}$Cm

^{244}Cm

NUCLEAR PROPERTIES

Spin and parity of ground state: 0^+

Ground state decay:

Alpha to ^{240}Pu

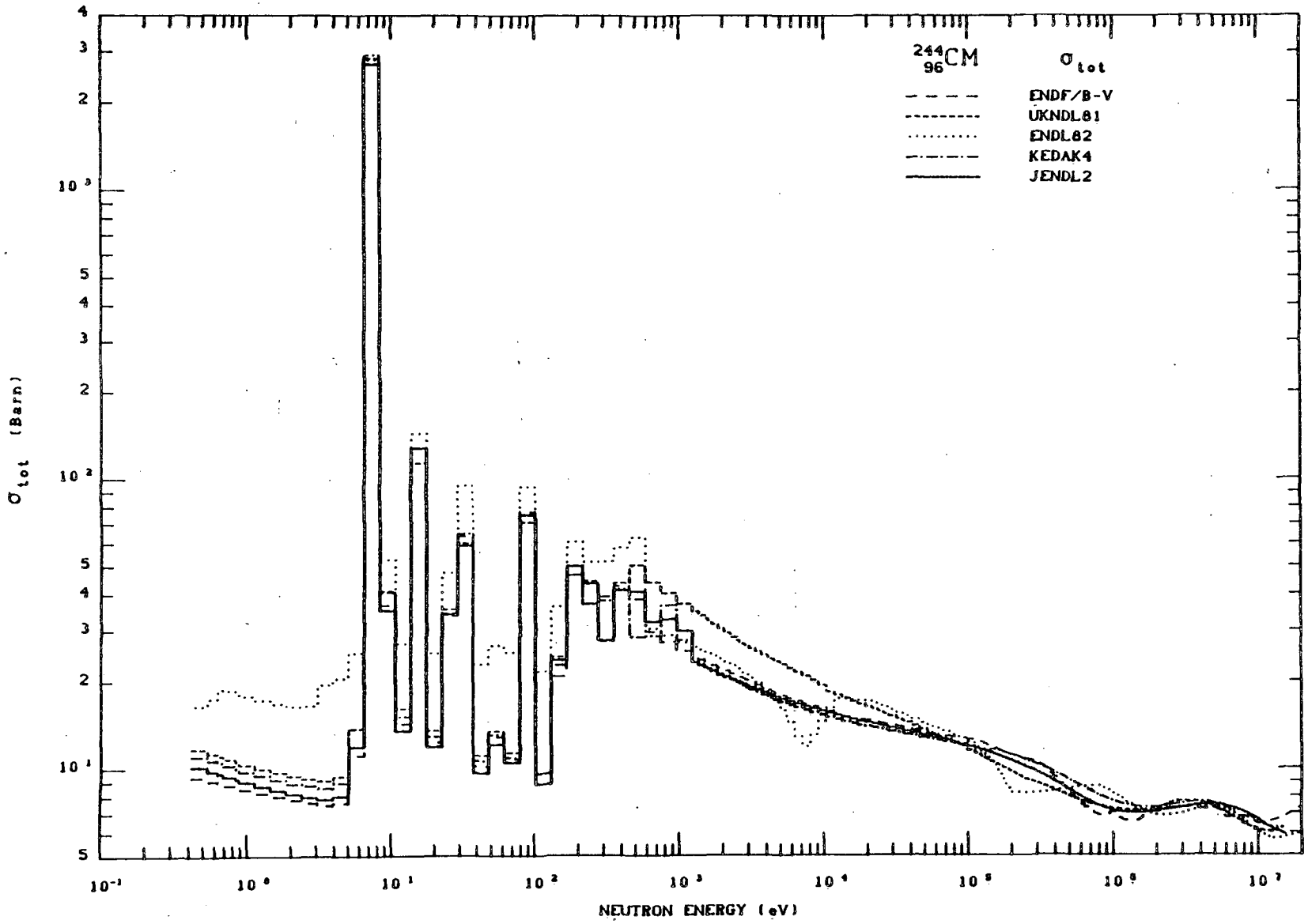
Half-life: 18.11 yr

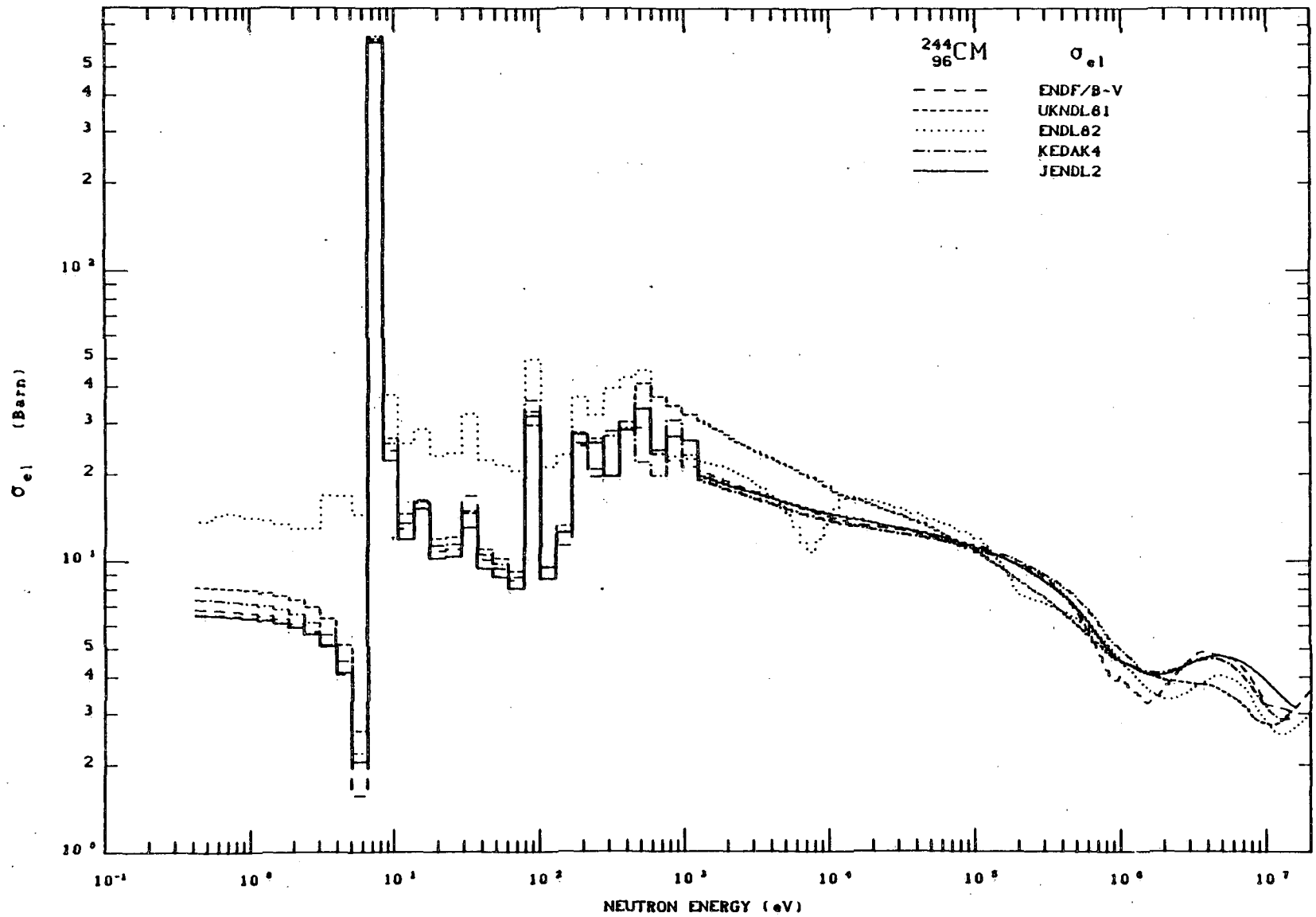
THERMAL CROSS SECTIONS (2200 m/s)

Reference	σ_γ	σ_f	σ_t	$\bar{\nu}_{sp}$	(barns)
ENDF/B - IV	13.4	0.88	23.6		
ENDF/B - V	10.37	0.6037	17.95		
UKNDL -81	14.26	0.8785	23.82		
ENDL -82	10.98	1.102	23.42		
KEDAK-4	14.40	1.030	23.00		
JENDL-2	14.41	1.180	22.24		
72 SRL, BENJAMIN		1.1			
BNL 325 (1984)	15.2	1.04	27.6	2.696	

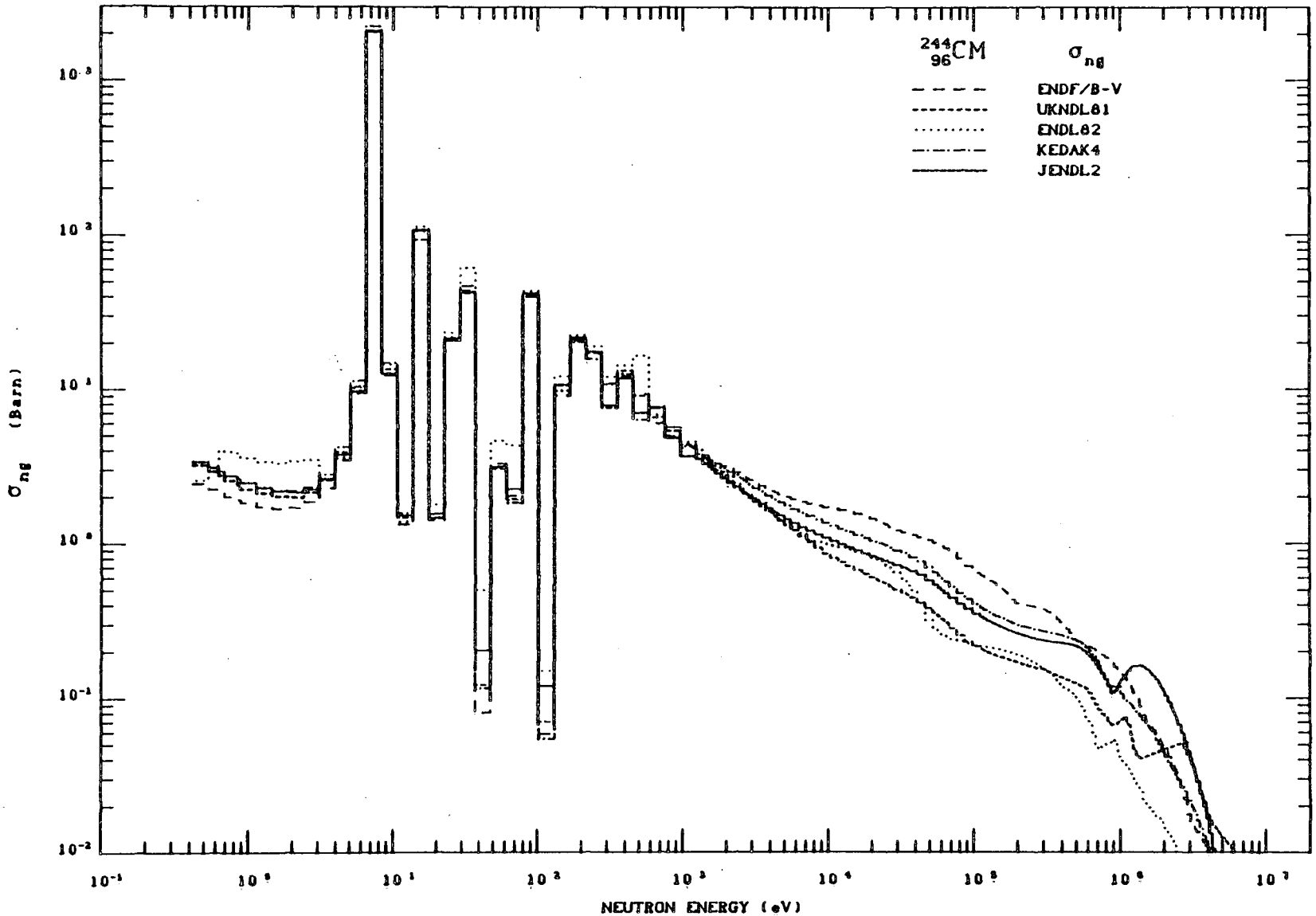
RESONANCE INTEGRALS

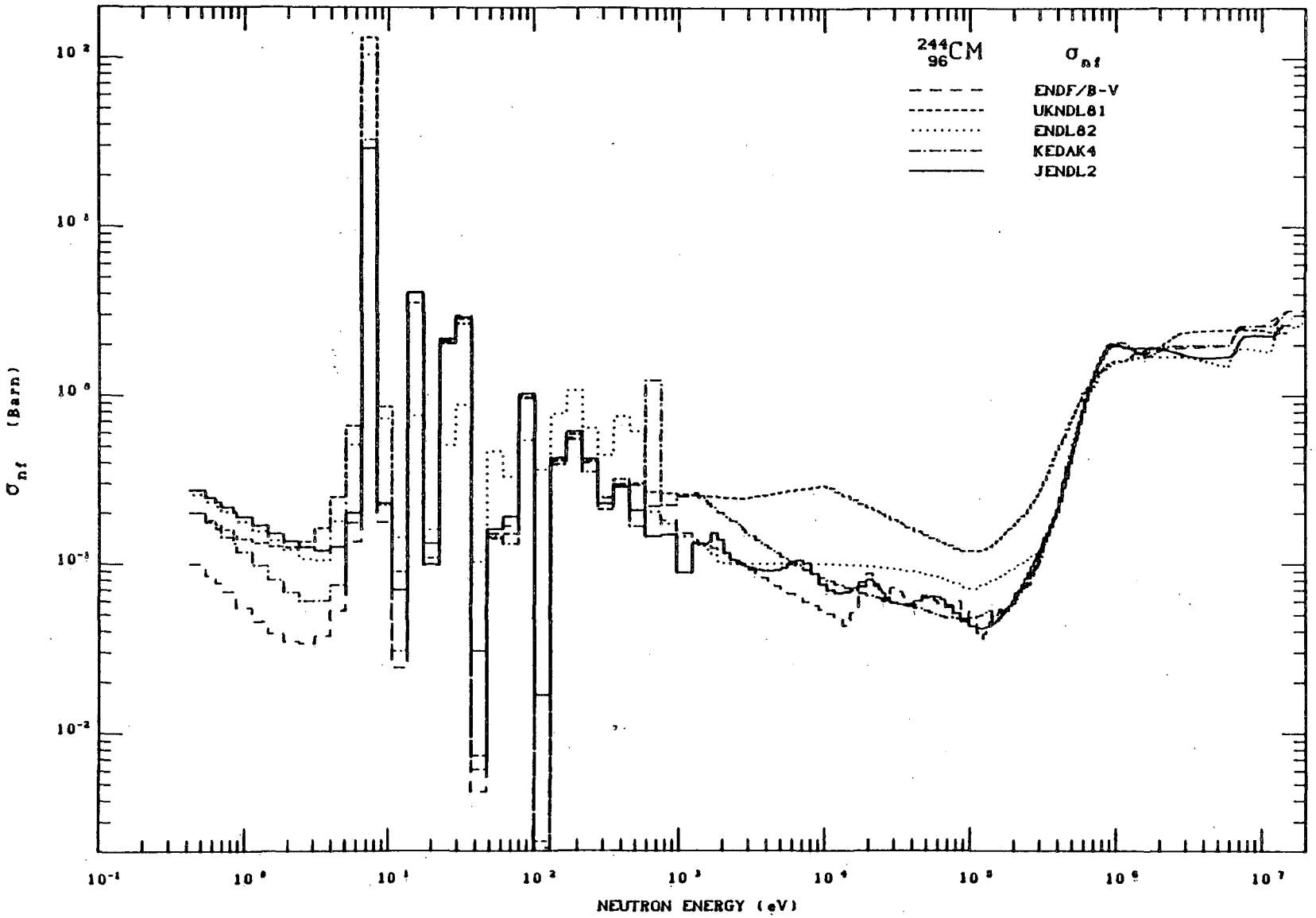
Reference	RI_γ	RI_f	(barns)
ENDF/B - IV	558.5	34.1	
ENDF/B - V	593.5	18.70	
UKNDL -81	593.0	44.18	
ENDL -82	610.8	35.06	
KEDAK-4	637.3	19.05	
JENDL-2	593.5	18.39	
72 SRL, BENJAMIN		18	
72 MTR, BERRETH	587		
BNL 325 (1984)	650	12.5	


$^{244}_{96}$CM
σ_{tot}
ENDF/B-V
UKNDL81
ENDL82
KEDAK4
JENDL2
σ_{tot} (Barn)
NEUTRON ENERGY (eV)


$^{244}_{96}$CM
σ_{el}
ENDF/B-V
UKNDL81
ENDL82
KEDAK4
JENDL2
σ_{el} (Barn)
NEUTRON ENERGY (eV)

$^{244}_{96}$Cm


$^{244}_{96}$CM
σ_{ng}
ENDF/B-V
UKNDL81
ENDL82
KEDAK4
JENDL2
σ_{ng} (Barn)
NEUTRON ENERGY (eV)


$^{244}_{96}$CM
σ_{nf}
ENDF/B-V
UKNDL81
ENDL82
KEDAK4
JENDL2
σ_{nf} (Barn)
NEUTRON ENERGY (eV)

$^{244}_{96}$Cm

^{245}Cm

NUCLEAR PROPERTIES

Spin and parity of ground state: $7/2^+$

Ground state decay:

Alpha to ^{241}Pu, Q_α = 5.623

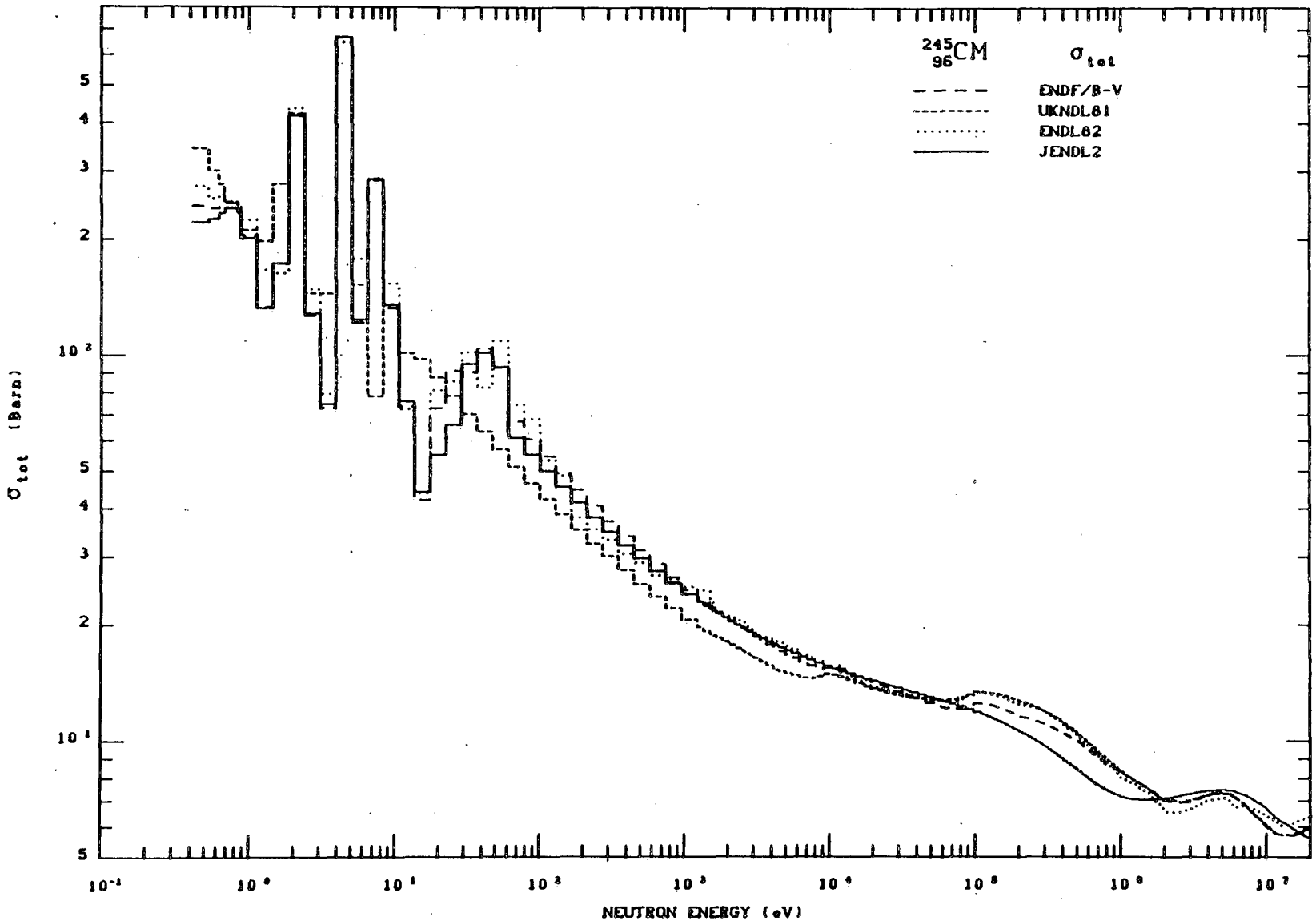
Half-life: 8.500 10^3 yr

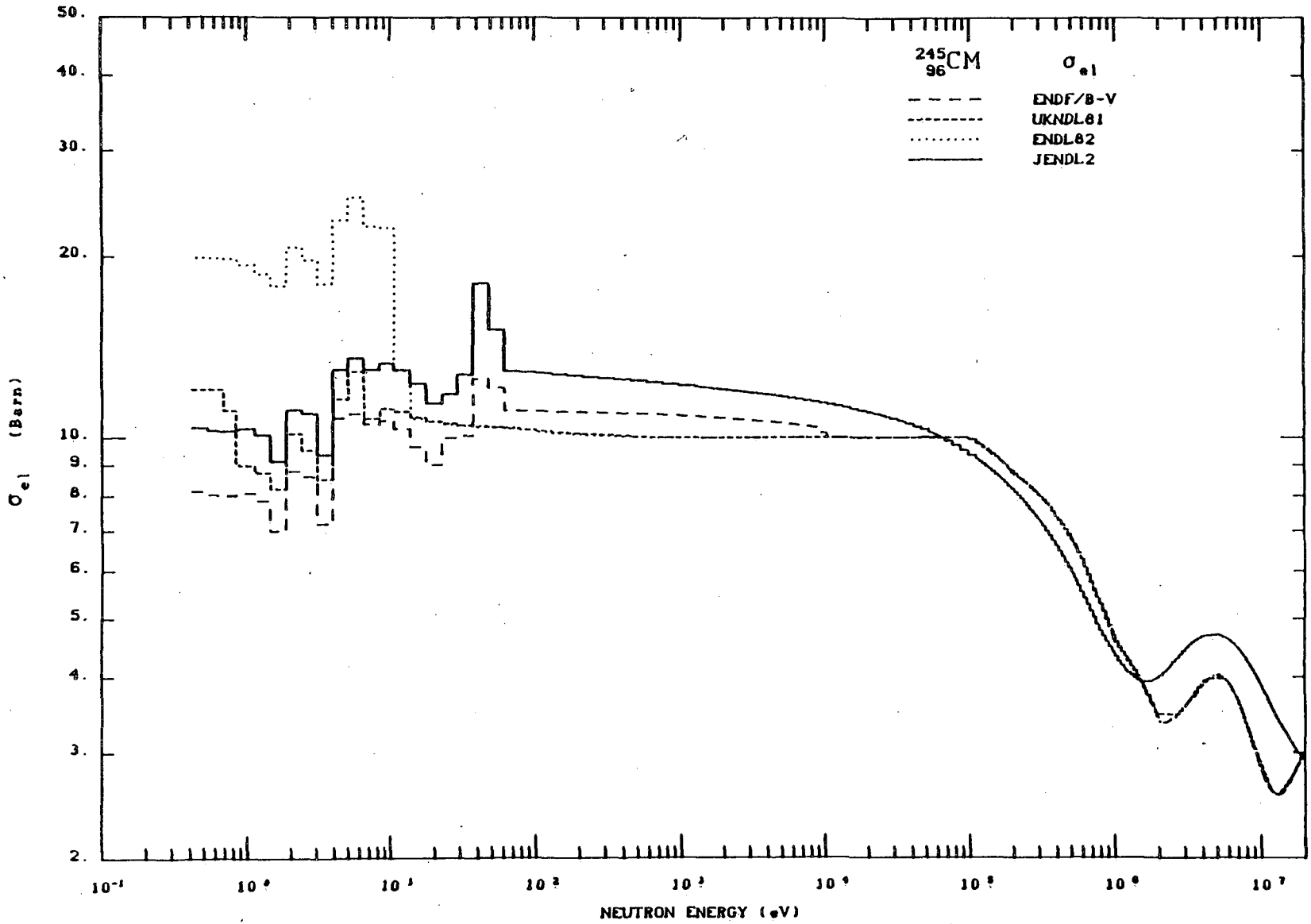
THERMAL CROSS SECTIONS (2200 m/s)

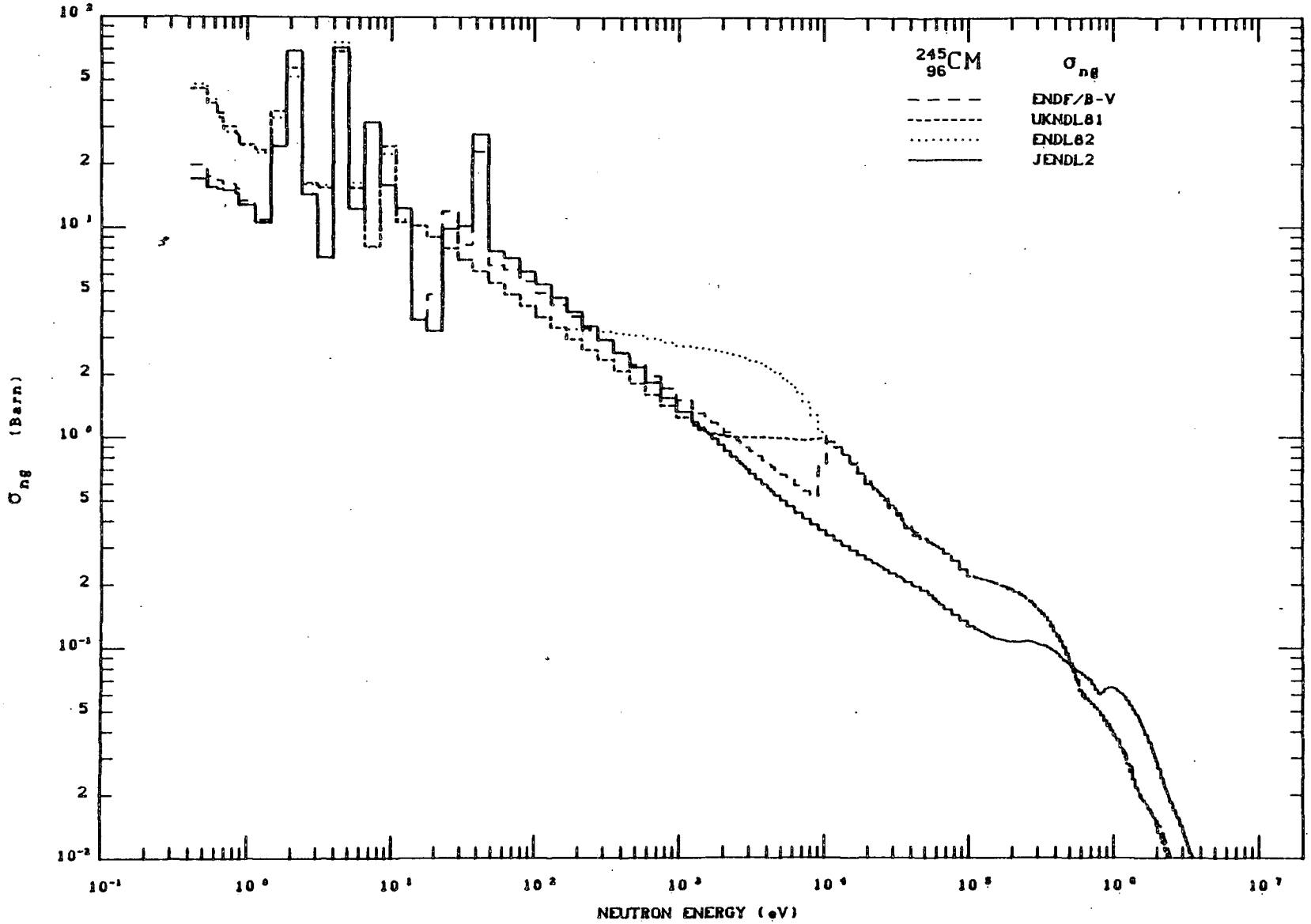
Reference	σ_γ	σ_f	σ_t	$\bar{\nu}_+$	(barns)
ENDF/B - V	342.1	2219	2570	3.83	
UKNDL -81	384.1	2166	2562		
ENDL -82	391.1	2020	2432		
JENDL-2	346.3	2001	2359	3.83	
72 SRL, BENJAMIN		2018			
78 LLL, BROWN		2143			
BNL 325 (1984)	369	2145		3.717	

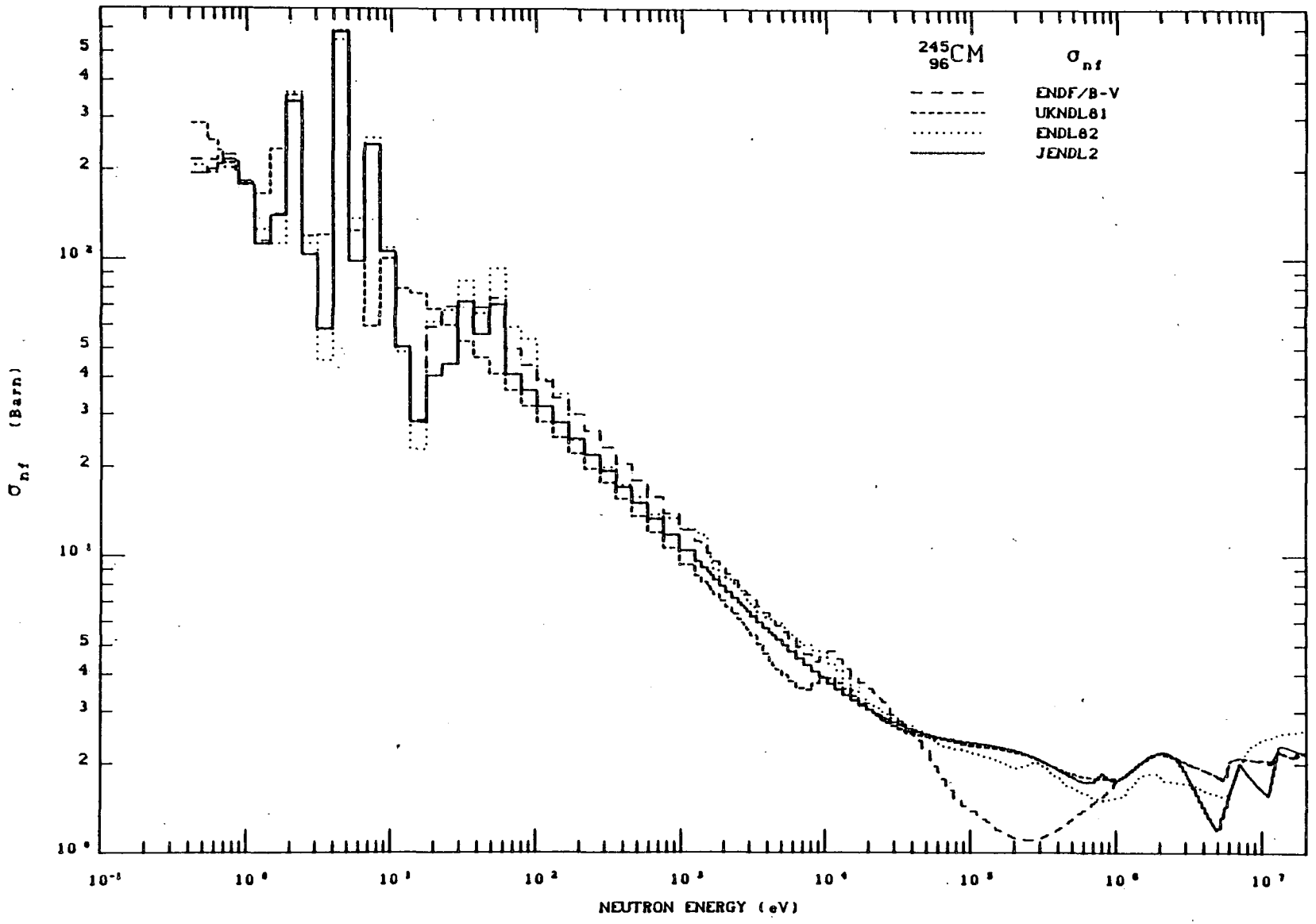
RESONANCE INTEGRALS

Reference	RI_γ	RI_f	(barns)
ENDF/B - V	108.6	837.0	
UKNDL -81	118.0	836.4	
ENDL -82	121.4	832.7	
JENDL-2	107.7	799.4	
72 SRL, BENJAMIN		772	
72 MTR, BERRETH	125		
BNL 325 (1984)	101	840	


$^{245}_{96}$CM
σ_{tot}
ENDF/B-V
UKNDL81
ENDL82
JENDL2
σ_{tot} (Barn)
NEUTRON ENERGY (eV)


$^{245}_{96}$CM
σ_{el}
ENDF/B-V
UKNDL81
ENDL82
JENDL2
σ_{el} (Barn)
NEUTRON ENERGY (eV)
50.
40.
30.
20.
10.
9.
8.
7.
6.
5.
4.
3.
2.
10^{-1}
10^{0}
10^{1}
10^{2}
10^{3}
10^{4}
10^{5}
10^{6}
10^{7}


$^{245}_{96}$CM
σ_{ng}
ENDF/B-V
UKNDL81
ENDL82
JENDL2
σ_{ng} (Barn)
NEUTRON ENERGY (eV)


$^{245}_{96}$CM
σ_{nf}
ENDF/B-V
UKNDL81
ENDL82
JENDL2
σ_{nf} (Barn)
NEUTRON ENERGY (eV)

$^{245}_{96}$Cm

^{246}Cm

NUCLEAR PROPERTIES

Spin and parity of ground state: 0^+

Ground state decay:

Alpha to ^{242}Pu: 99.97%, Q_α = 5.476 MeV

Spontaneous fission: 0.02614 %

Half-life: 4.730 10^3 yr

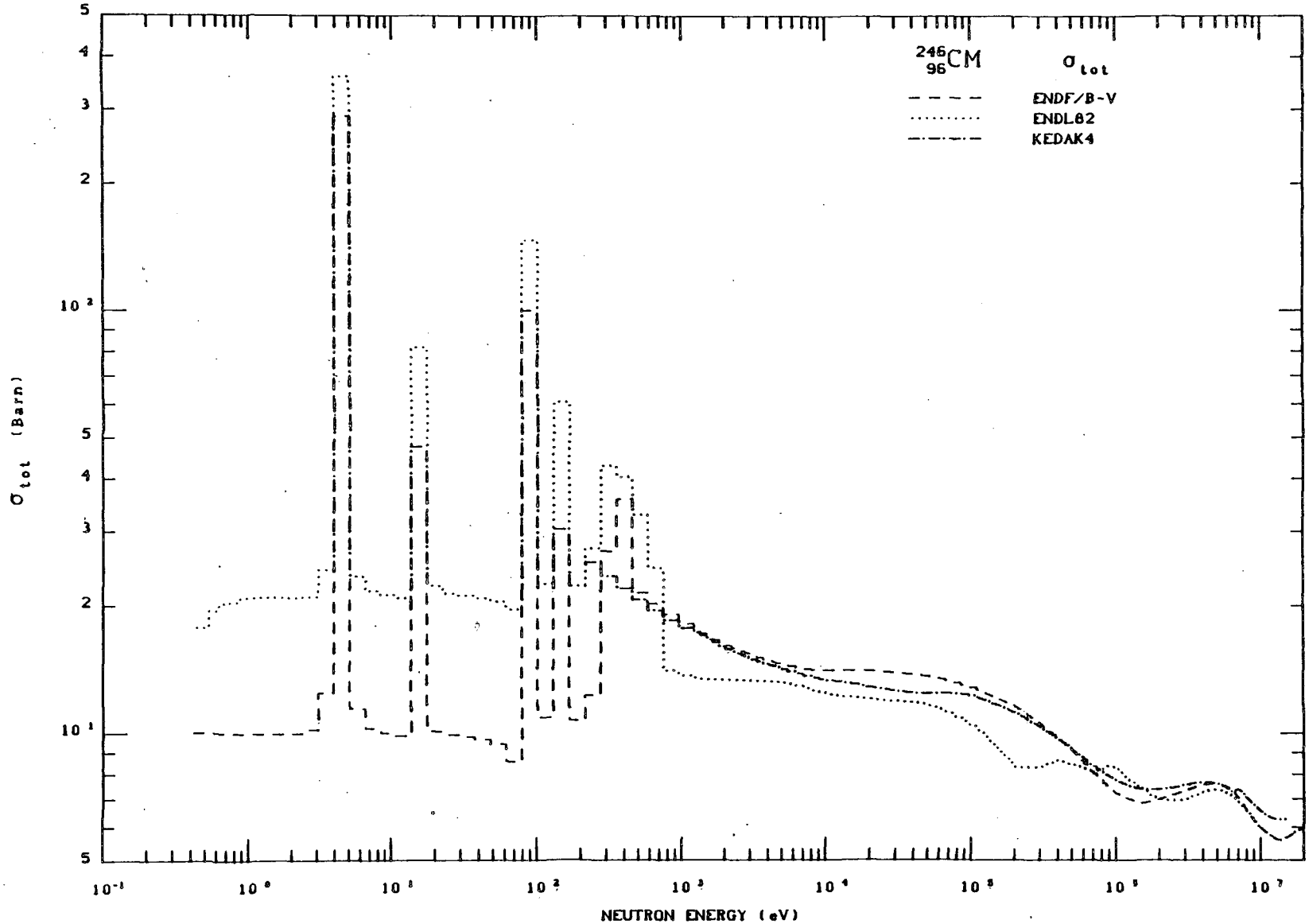
1.8 10^7 yr - spontaneous fission

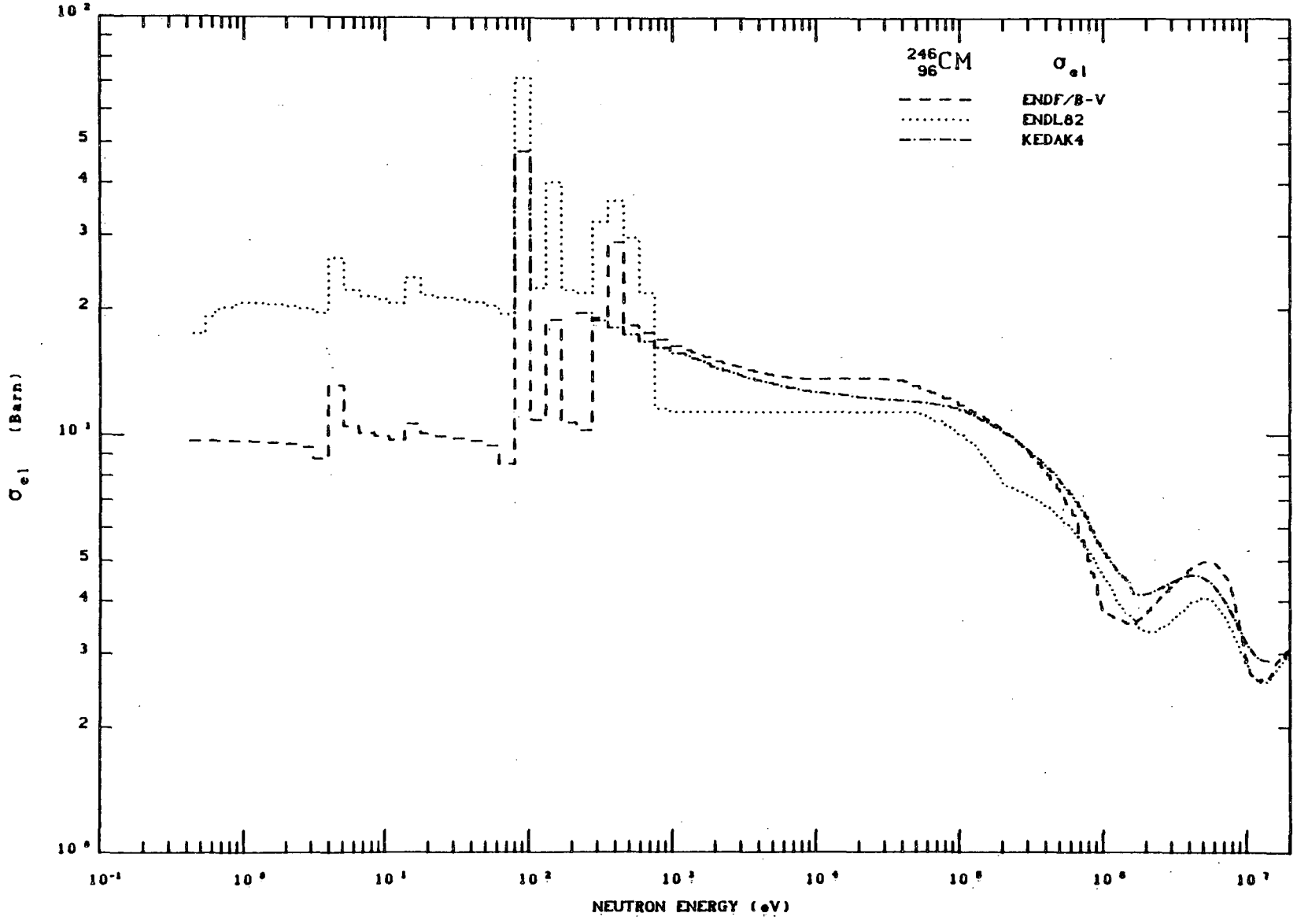
THERMAL CROSS SECTIONS (2200 m/s)

Reference	σ_γ	σ_f	σ_t	$\bar{\nu}_{sp}$	(barns)
ENDF/B - V	1.298	0.06322	11.05		
ENDL -82	1.201	0.1703	12.71		
BNL 325 (1984)	1.22	0.14		2.950	

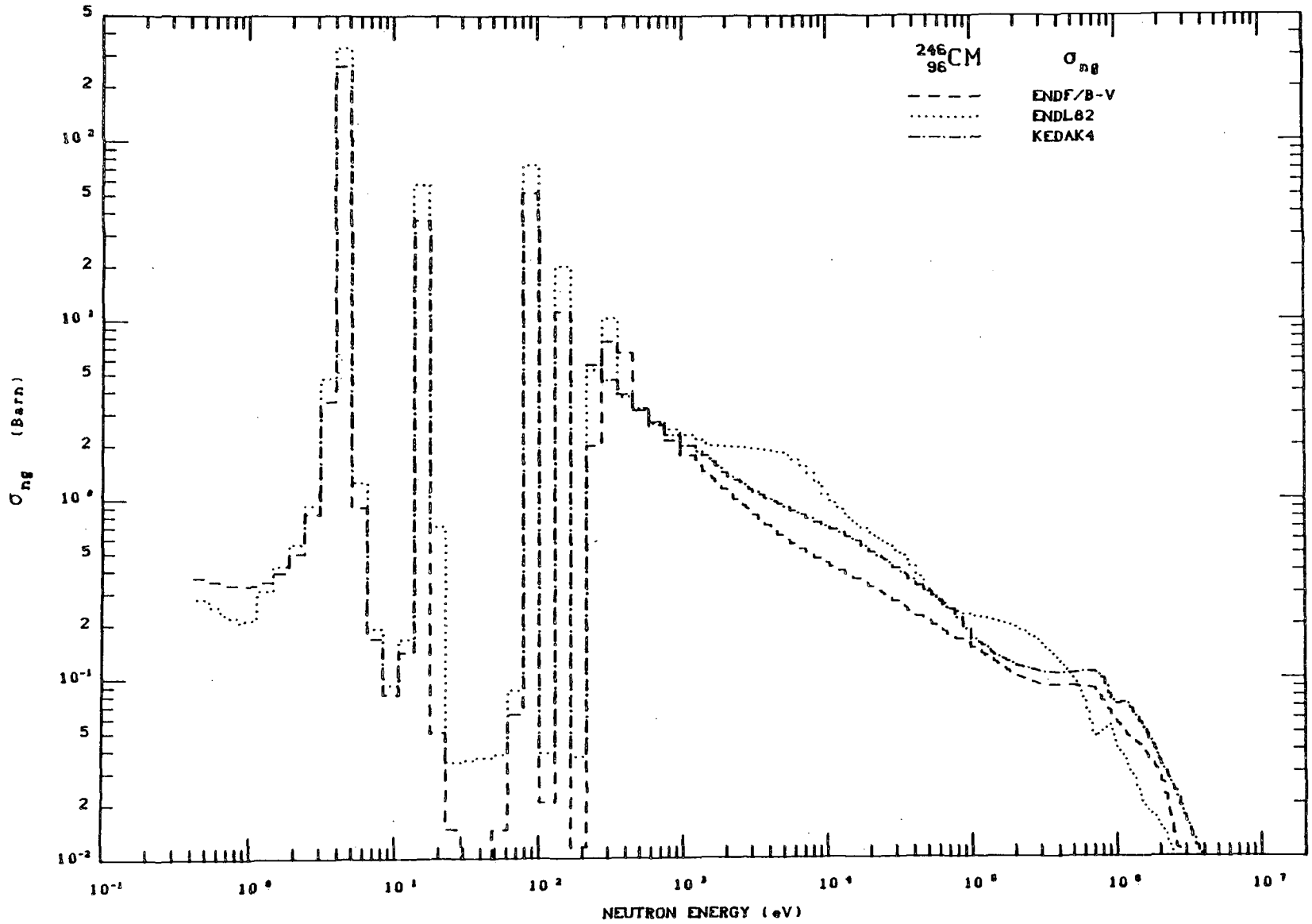
RESONANCE INTEGRALS

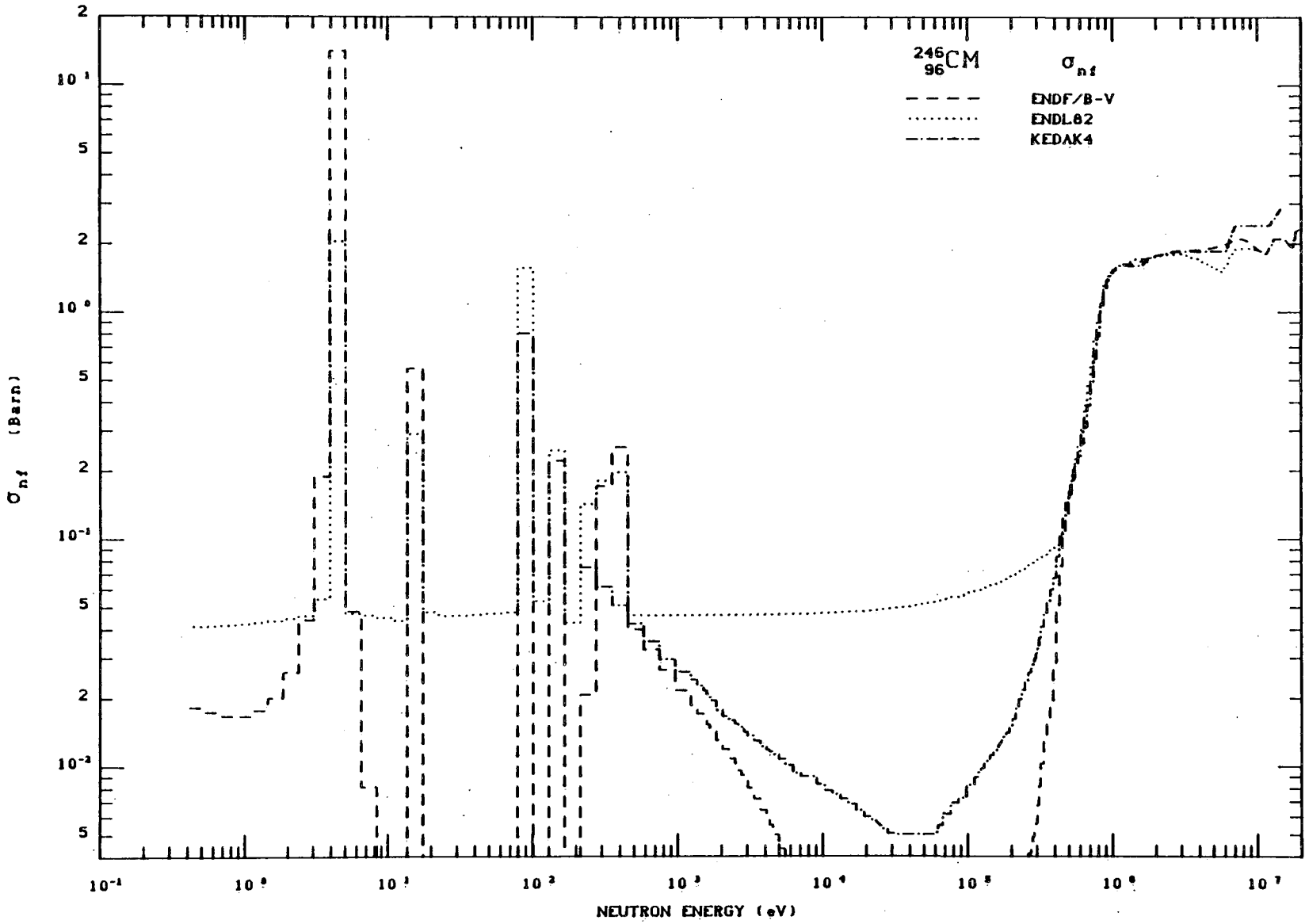
Reference	RI_γ	RI_f	(barns)
ENDF/B - V	103.8	10.42	
ENDL -82	139.0	7.649	
KEDAK-4	10.23	5.992	
68 SRL, FOGLER	260		
BNL 325 (1984)	121	10.2	


$^{246}_{96}$CM
σ_{tot}
ENDF/B-V
ENDL82
KEDAK4
σ_{tot} (Barn)
NEUTRON ENERGY (eV)


$^{246}_{96}$CM
σ_{el}
ENDF/B-V
ENDL82
KEDAK4
σ_{el} (Barn)
NEUTRON ENERGY (eV)

$^{246}_{96}$Cm


$^{246}_{96}$CM
σ_{ng}
ENDF/B-V
ENDL82
KEDAK4
σ_{ng} (Barn)
NEUTRON ENERGY (eV)


$^{246}_{96}$CM
σ_{nf}
ENDF/B-V
ENDL82
KEDAK4
σ_{nf} (Barn)
NEUTRON ENERGY (eV)

$^{246}_{96}$Cm

^{247}Cm

NUCLEAR PROPERTIES

Spin and parity of ground state: $9/2^-$

Ground state decay:

Alpha to ^{243}Pu: 100%, Q_α = 5.353

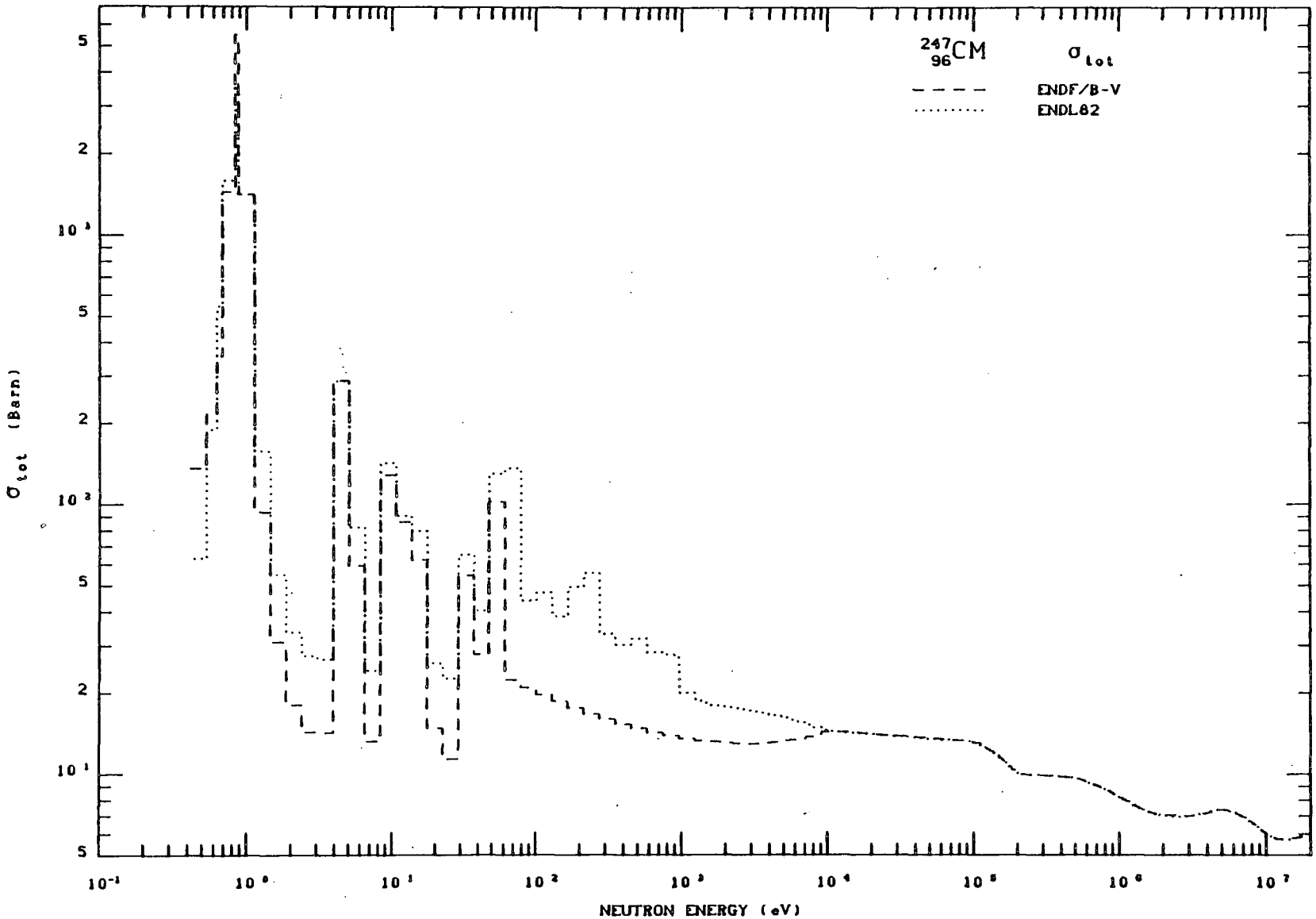
Half-life: 1.56 10^7 yr

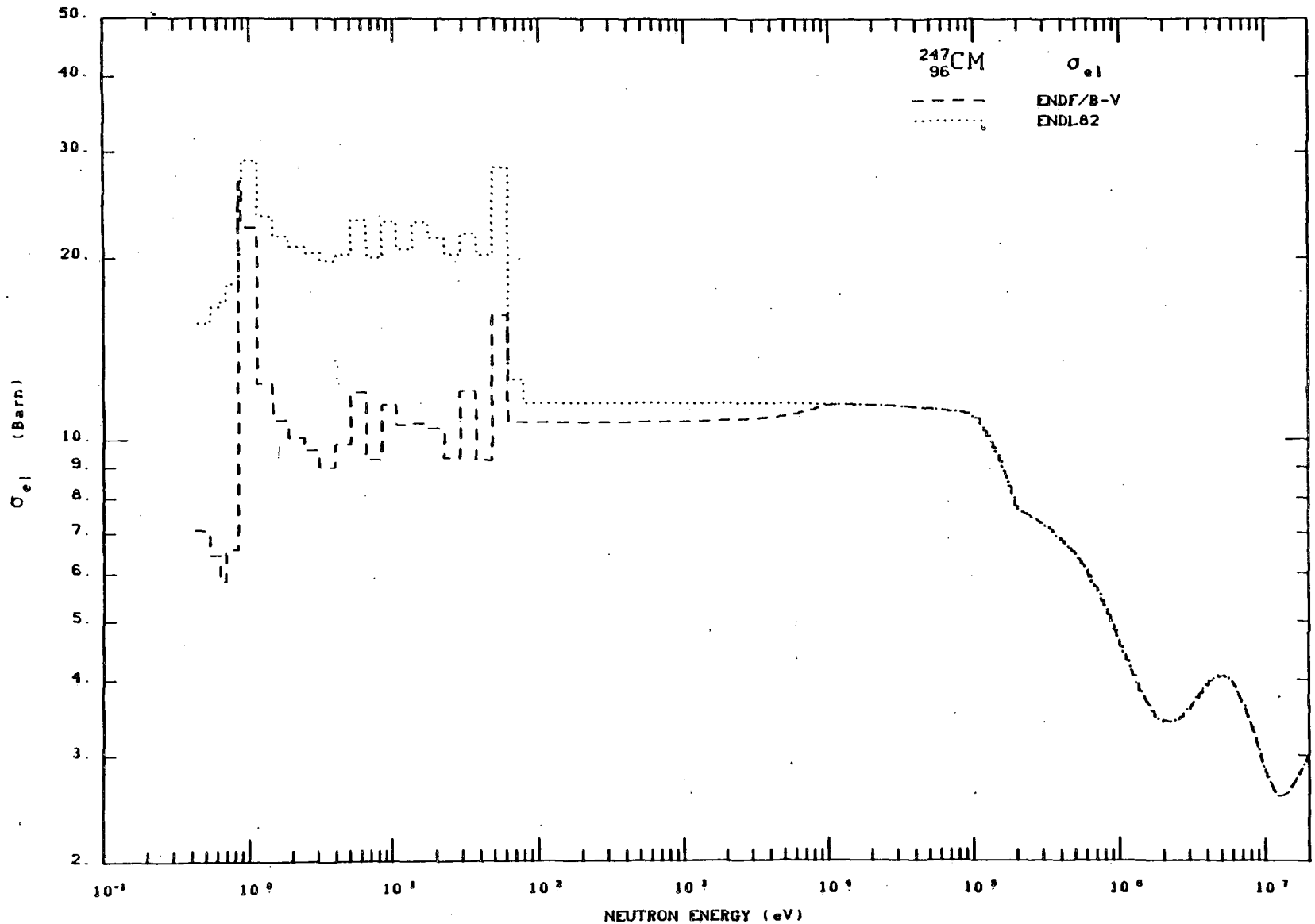
THERMAL CROSS SECTIONS (2200 m/s)

Reference	σ_γ	σ_f	σ_t	$\bar{\nu}_p$	(barns)
ENDL -82	90.09	82.53	184.0		
68 SRL, SMITH	48	409			
BNL 325 (1984)	57	81.8(Maxw)		3.79	

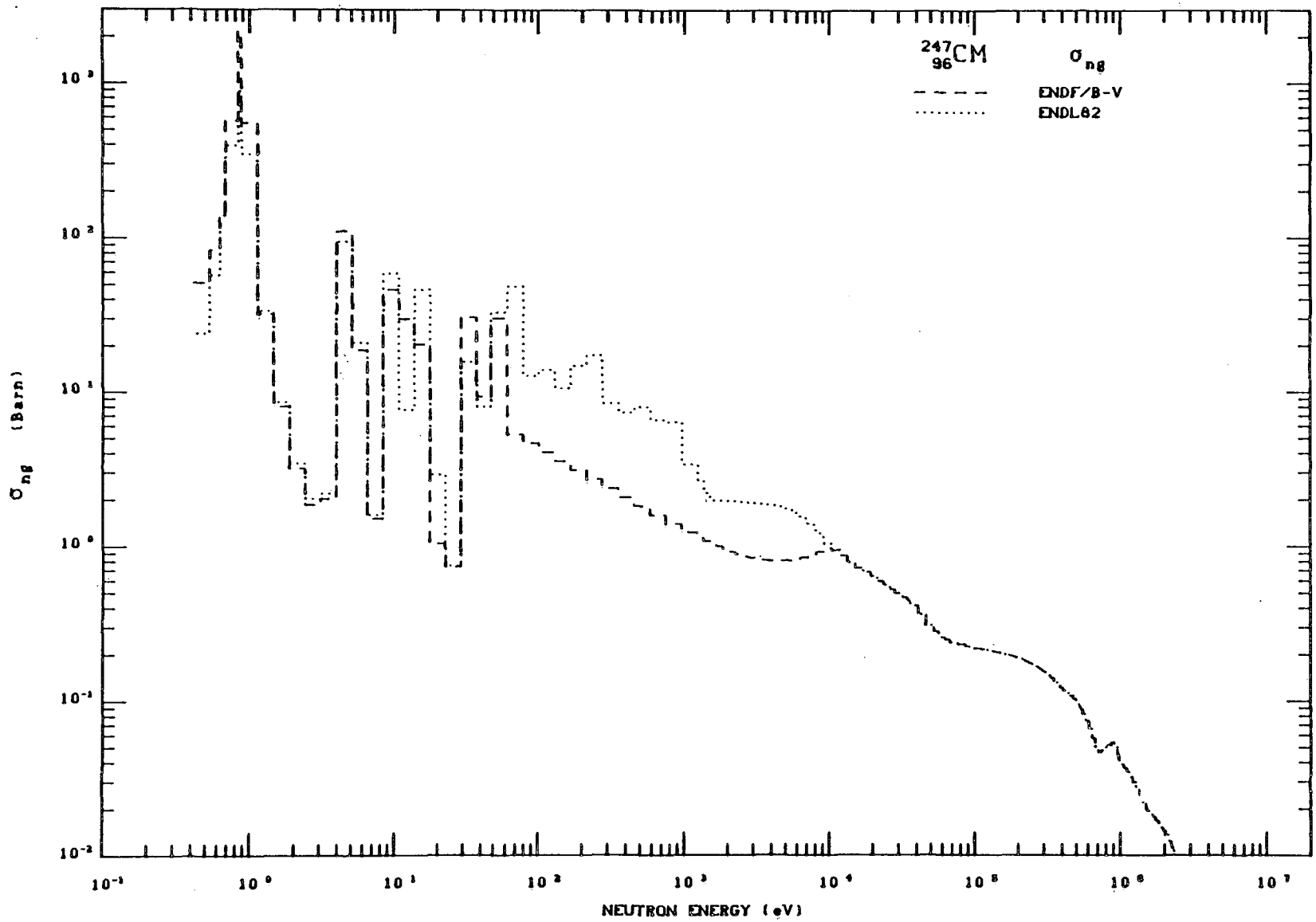
RESONANCE INTEGRALS

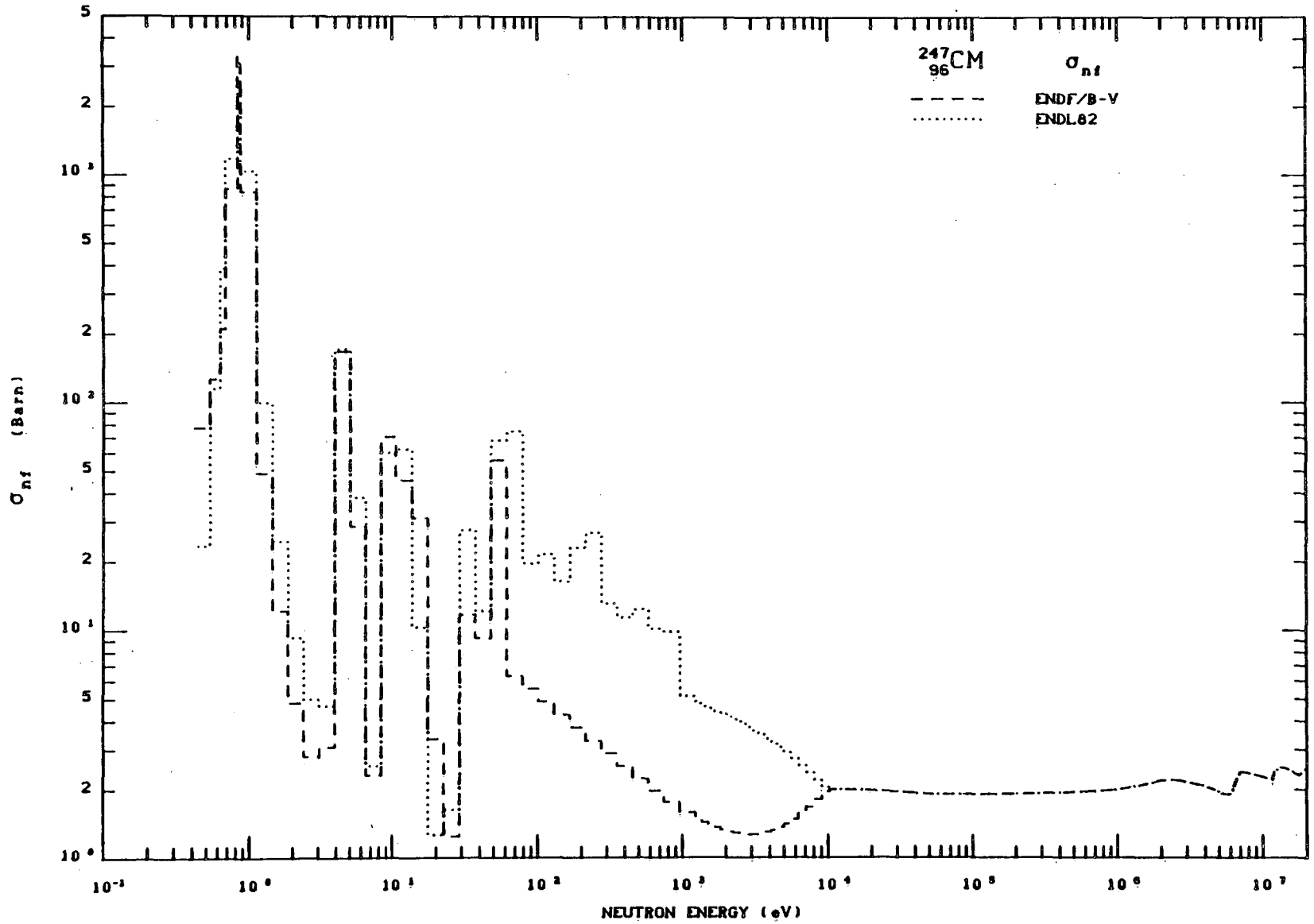
Reference	RI_γ	RI_f	(barns)
ENDL -82	364.0	918.8	
72 SRL, BENJAMIN		778	
BNL 325 (1984)	530	760	


$^{247}_{96}$CM
σ_{tot}
ENDF/B-V
ENDL82
σ_{tot} (Barn)
NEUTRON ENERGY (eV)
5
2
10^{1}
5
2
10^{2}
5
2
10^{1}
5
10^{-1}
10^{0}
10^{1}
10^{2}
10^{3}
10^{4}
10^{5}
10^{6}
10^{7}


$^{247}_{96}$CM
σ_{el}
ENDF/B-V
ENDL82
σ_{el} (Barn)
NEUTRON ENERGY (eV)
50.
40.
30.
20.
10.
9.
8.
7.
6.
5.
4.
3.
2.
10^{-1}
10^{0}
10^{1}
10^{2}
10^{3}
10^{4}
10^{5}
10^{6}
10^{7}

$^{247}_{96}$Cm


$^{247}_{96}$CM
σ_{ng}
ENDF/B-V
ENDL82
σ_{ng} (Barn)
NEUTRON ENERGY (eV)


$^{247}_{96}$CM
σ_{nf}
ENDF/B-V
ENDL82
σ_{nf} (Barn)
NEUTRON ENERGY (eV)

$^{247}_{96}$Cm

^{248}Cm

NUCLEAR PROPERTIES

Spin and parity of ground state: 0^+

Ground state decay:

Alpha to ^{244}Pu: 91.74%, Q_α = 5.161 MeV

Spontaneous fission: 8.26%

Half-life: 3.40 10^5 yr

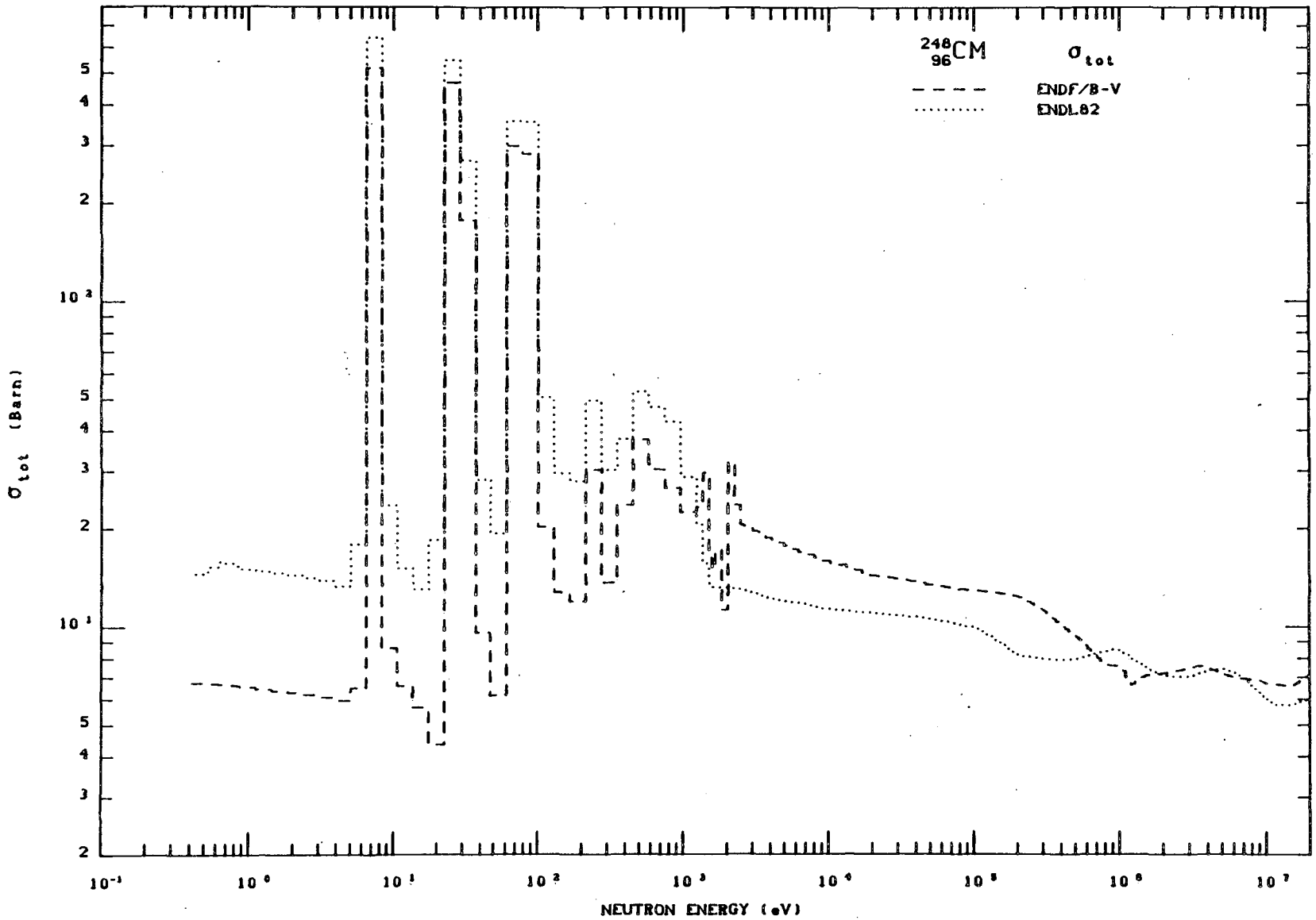
4.1 10^6 yr - spontaneous fission

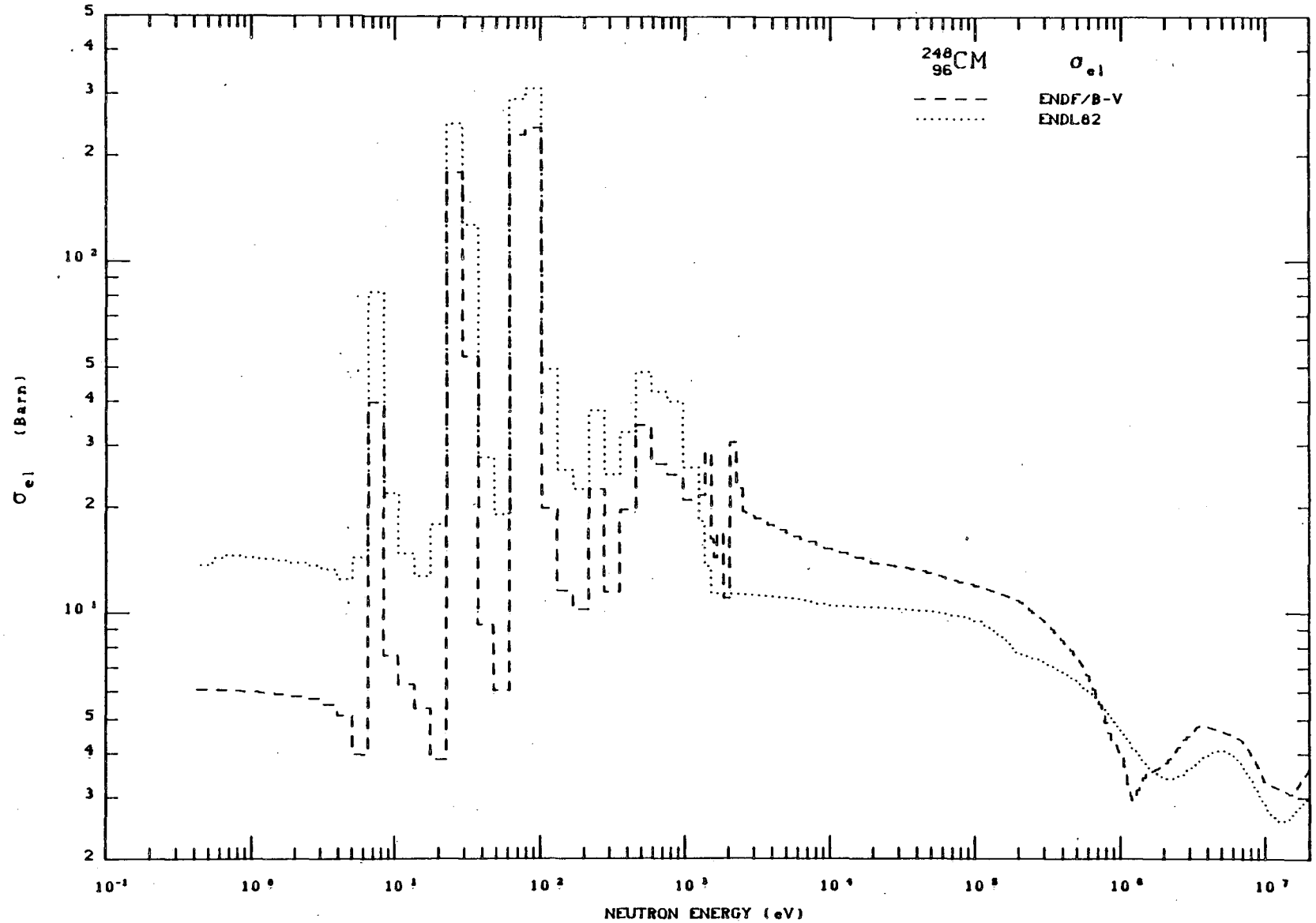
THERMAL CROSS SECTIONS (2200 m/s)

Reference	σ_γ	σ_f	σ_t	$\bar{\nu}_{sp}$	(barns)
ENDL -82	3.034	0.3407	14.71		
68 SRL, SMITH	5.1				
72 SRL, BENJAMIN		0.34			
BNL 325 (1984)	2.63	0.37(Maxw)		3.157	

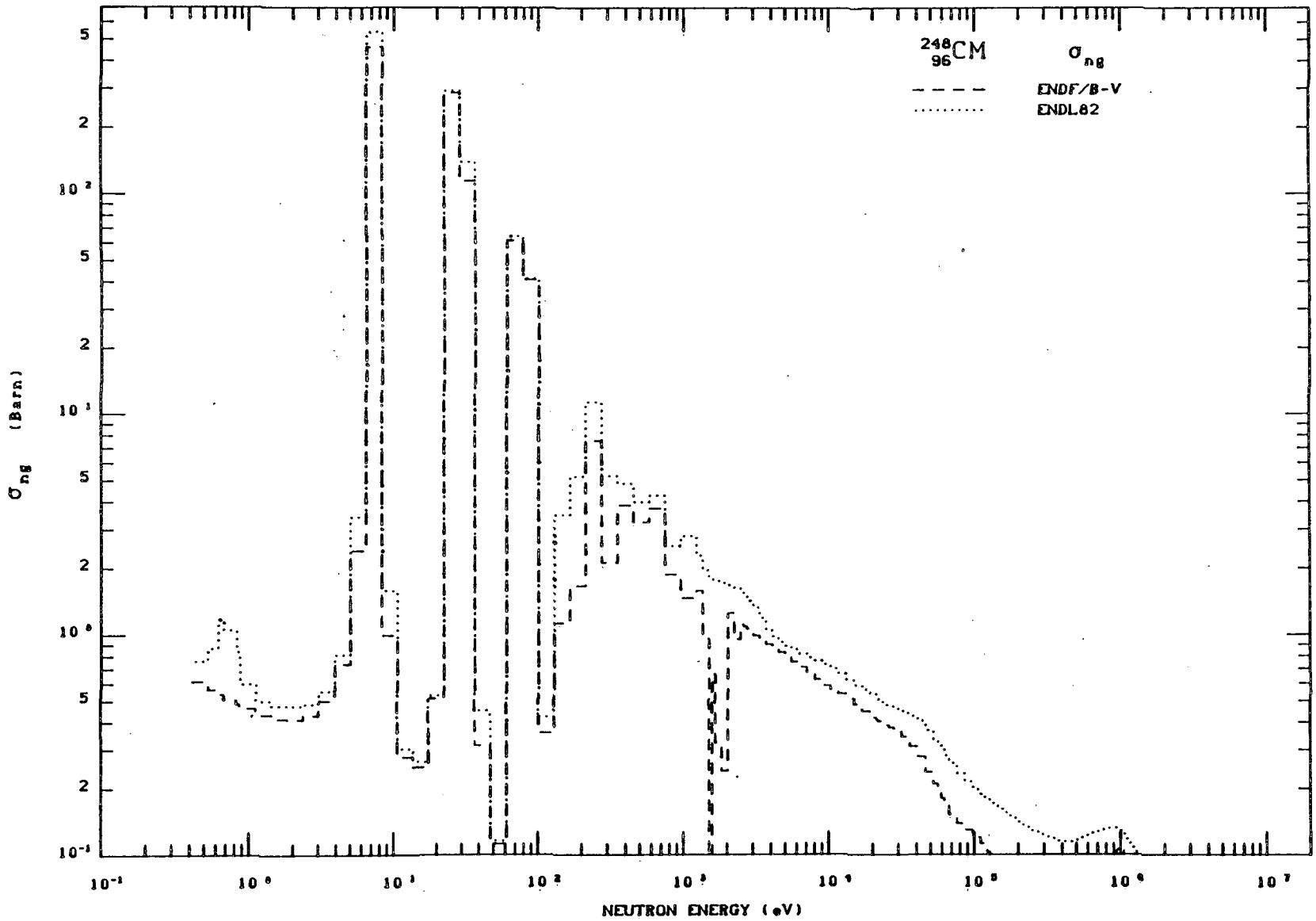
RESONANCE INTEGRALS

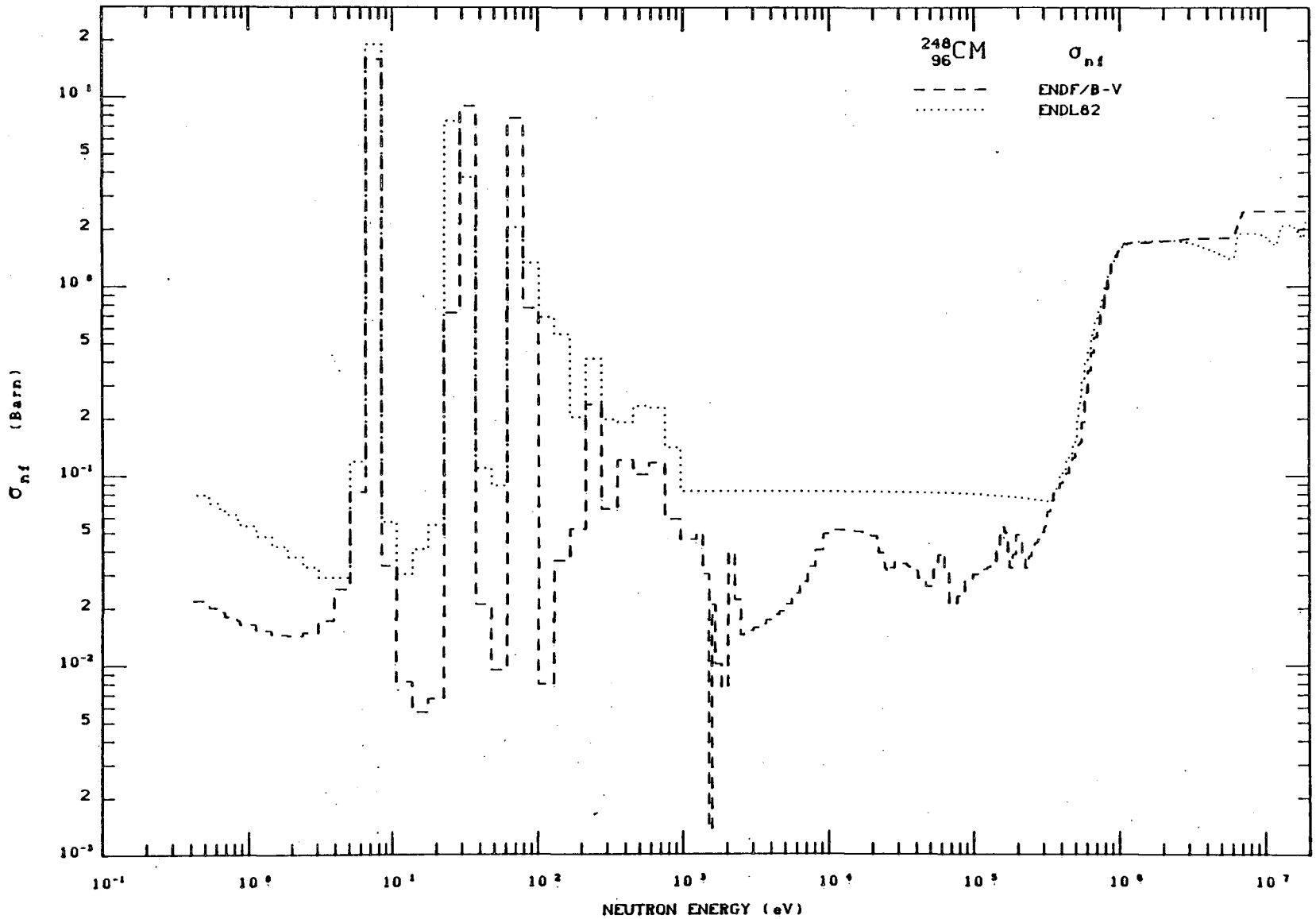
Reference	RI_γ	RI_f	(barns)
ENDL -82	282.8	15.56	
72 SRL, BENJAMIN		13.2	
BNL 325 (1984)	270	15	


$^{248}_{96}$CM
σ_{tot}
ENDF/B-V
ENDL82
σ_{tot} (Barn)
NEUTRON ENERGY (eV)


$^{248}_{96}$CM
σ_{el}
ENDF/B-V
ENDL82
σ_{el} (Barn)
NEUTRON ENERGY (eV)

$^{248}_{96}$Cm


$^{248}_{96}$CM
σ_{ng}
ENDF/B-V
ENDL82
σ_{ng} (Barn)
NEUTRON ENERGY (eV)


$^{248}_{96}$CM
σ_{nf}
ENDF/B-V
ENDL82
σ_{nf} (Barn)
NEUTRON ENERGY (eV)

$^{248}_{96}$Cm

^{249}Bk

NUCLEAR PROPERTIES

Spin and parity of ground state: $7/2^+$

Ground state decay:

Beta (β^-) to ^{249}Cf: 99%

Alpha to ^{245}Am: 1.5 10^{-3}%

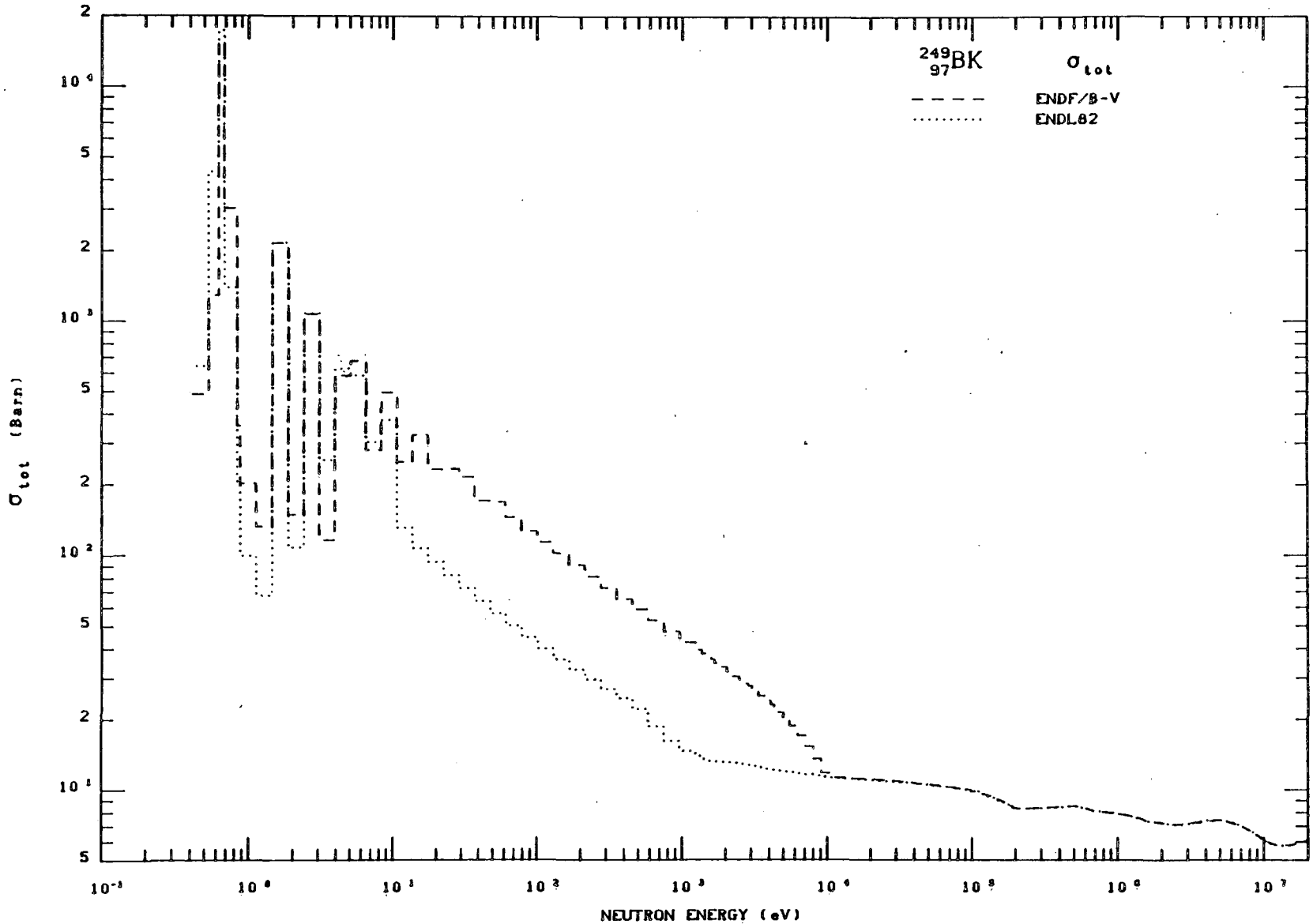
Half-life: 320 d

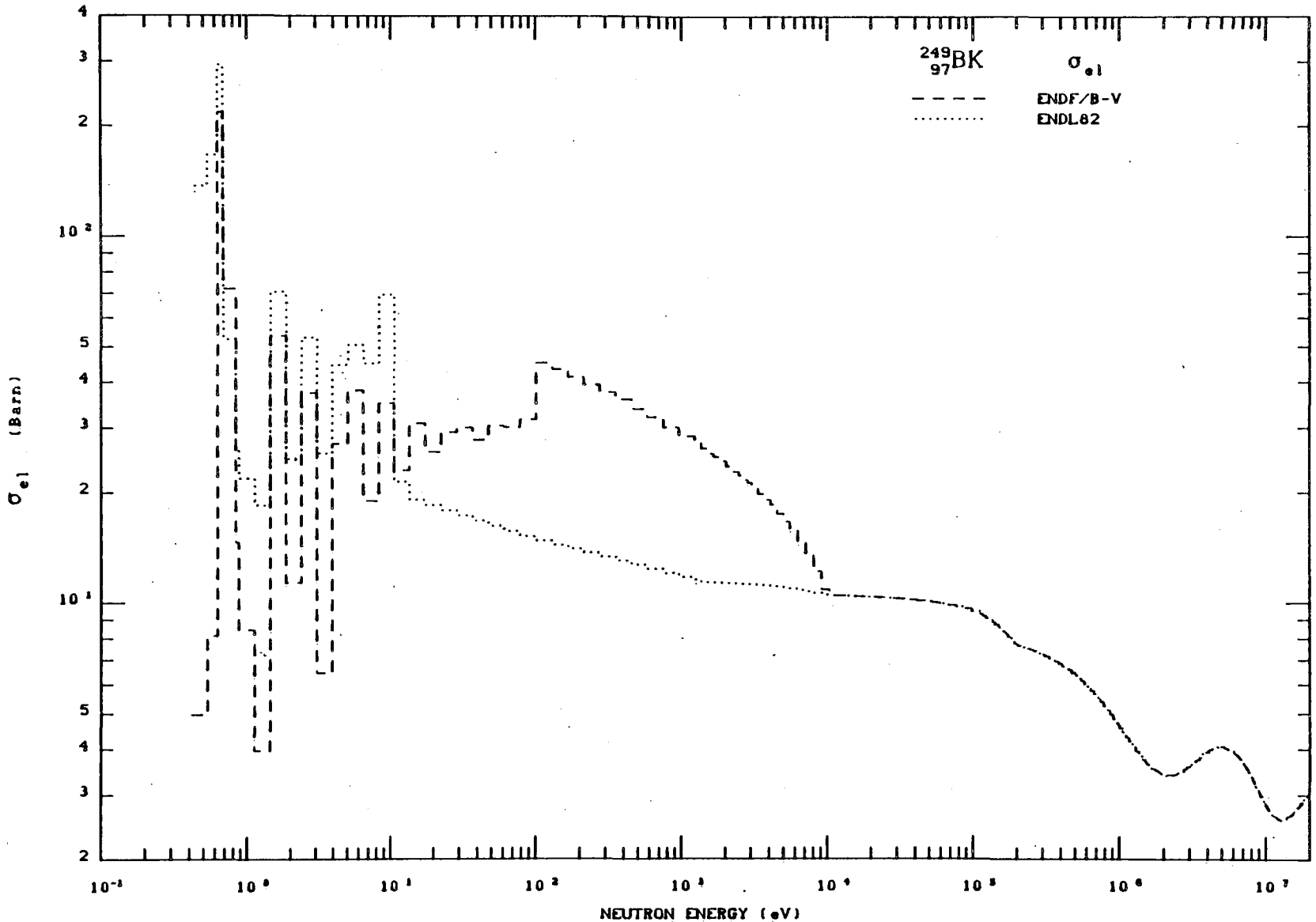
THERMAL CROSS SECTIONS (2200 m/s)

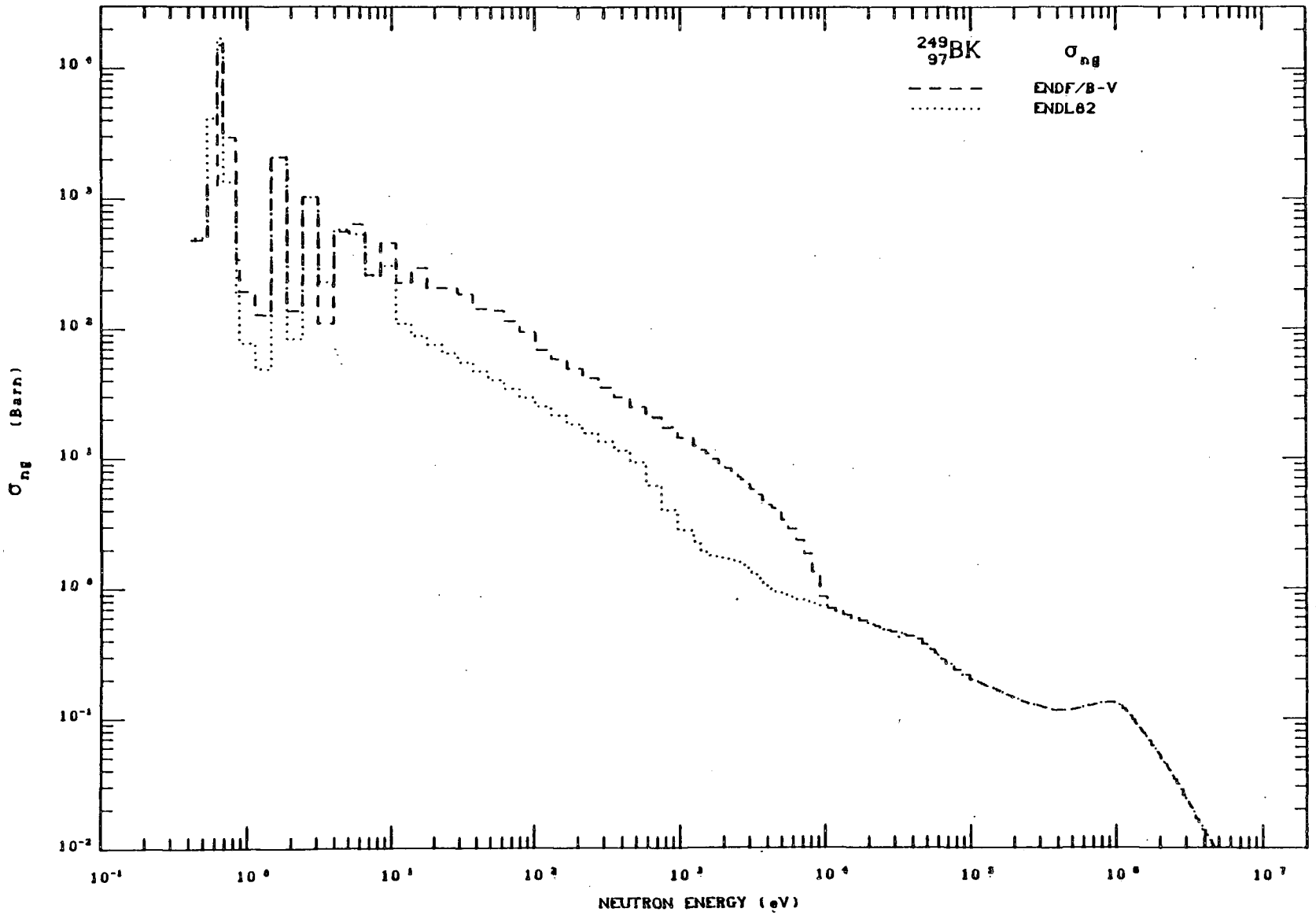
Reference	σ_γ	σ_f	σ_t	$\bar{\nu}_{sp}$	(barns)
ENDL -82	1604	1.002	1616		
BNL 325 (1984)	746			3.395	

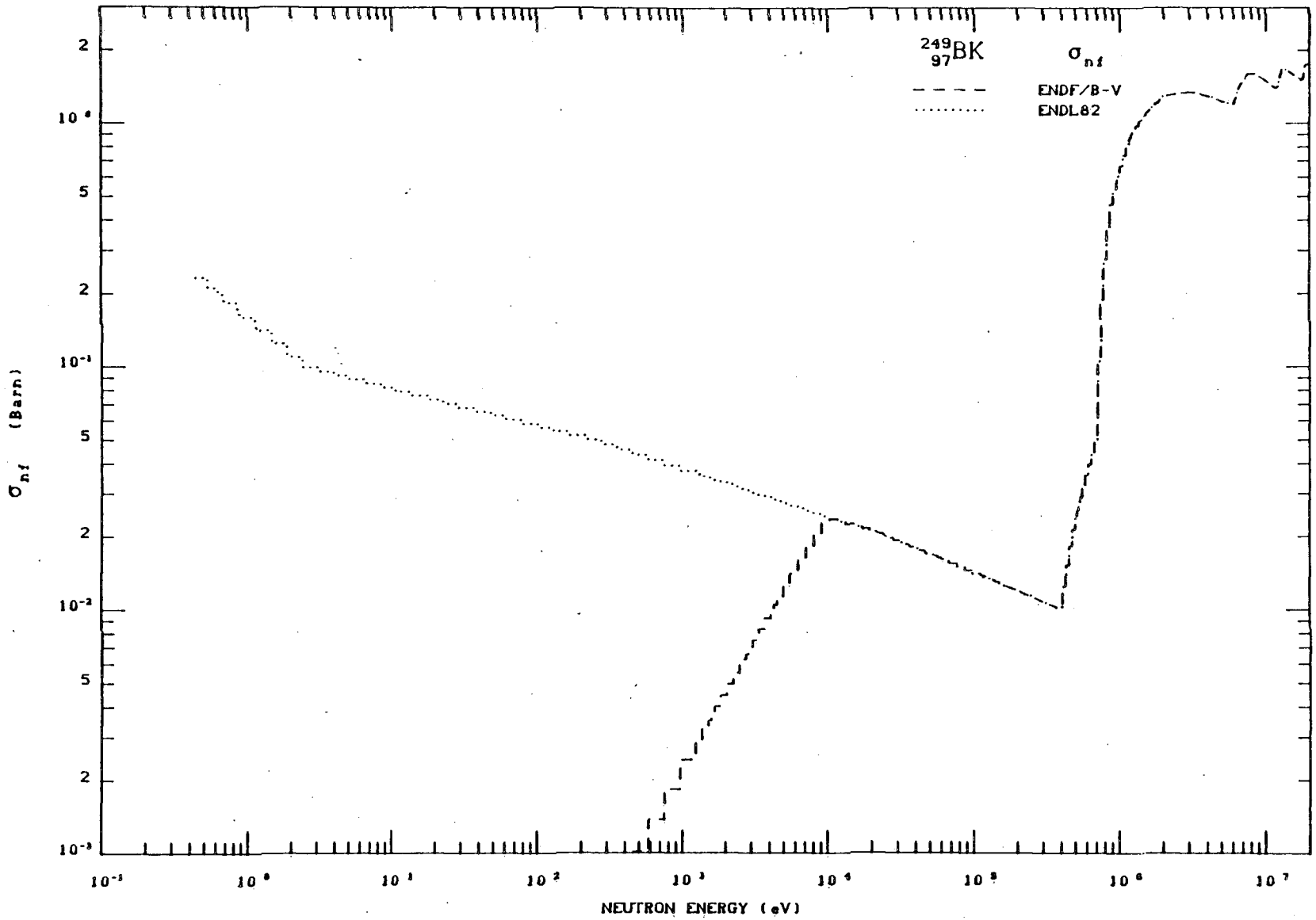
RESONANCE INTEGRALS

Reference	RI_γ	RI_f	(barns)
ENDL -82	3938	4.900	
BNL 325 (1984)	1100		


$^{249}_{97}$BK
σ_{tot}
ENDF/B-V
ENDL82
σ_{tot} (Barn)
NEUTRON ENERGY (eV)


249 97 BK
σel
ENDF/B-V
ENDL82
σel (Barn)
NEUTRON ENERGY (eV)


$^{249}_{97}$BK
σ_{ng}
ENDF/B-V
ENDL82
σ_{ng} (Barn)
NEUTRON ENERGY (eV)


249 97 BK
σ nf
ENDF/B-V
ENDL82
σ nf (Barn)
NEUTRON ENERGY (eV)

^{249}Cf

NUCLEAR PROPERTIES

Spin and parity of ground state: $9/2^-$

Ground state decay:

Alpha to ^{245}Cm

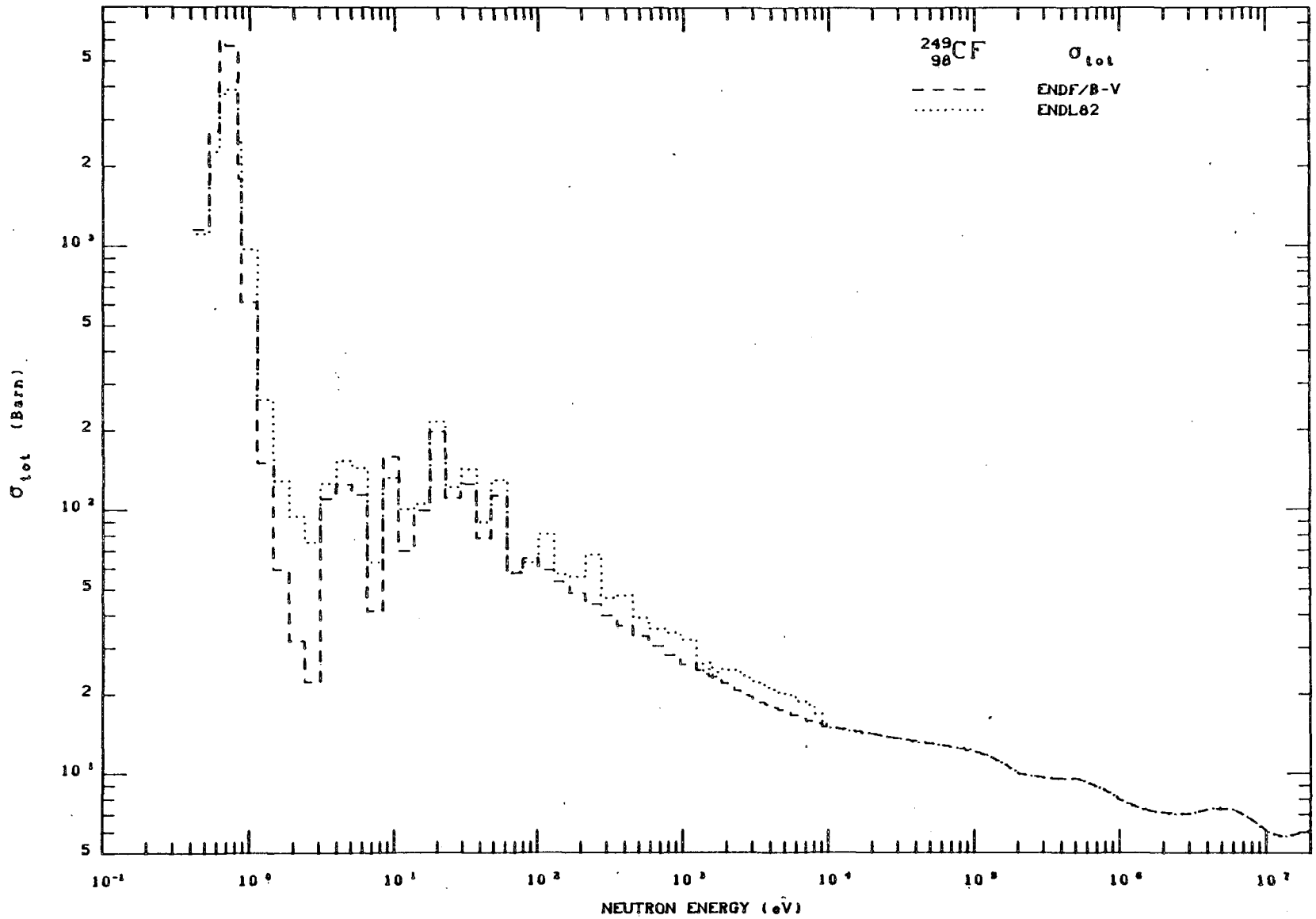
Half-life: 350.6 yr

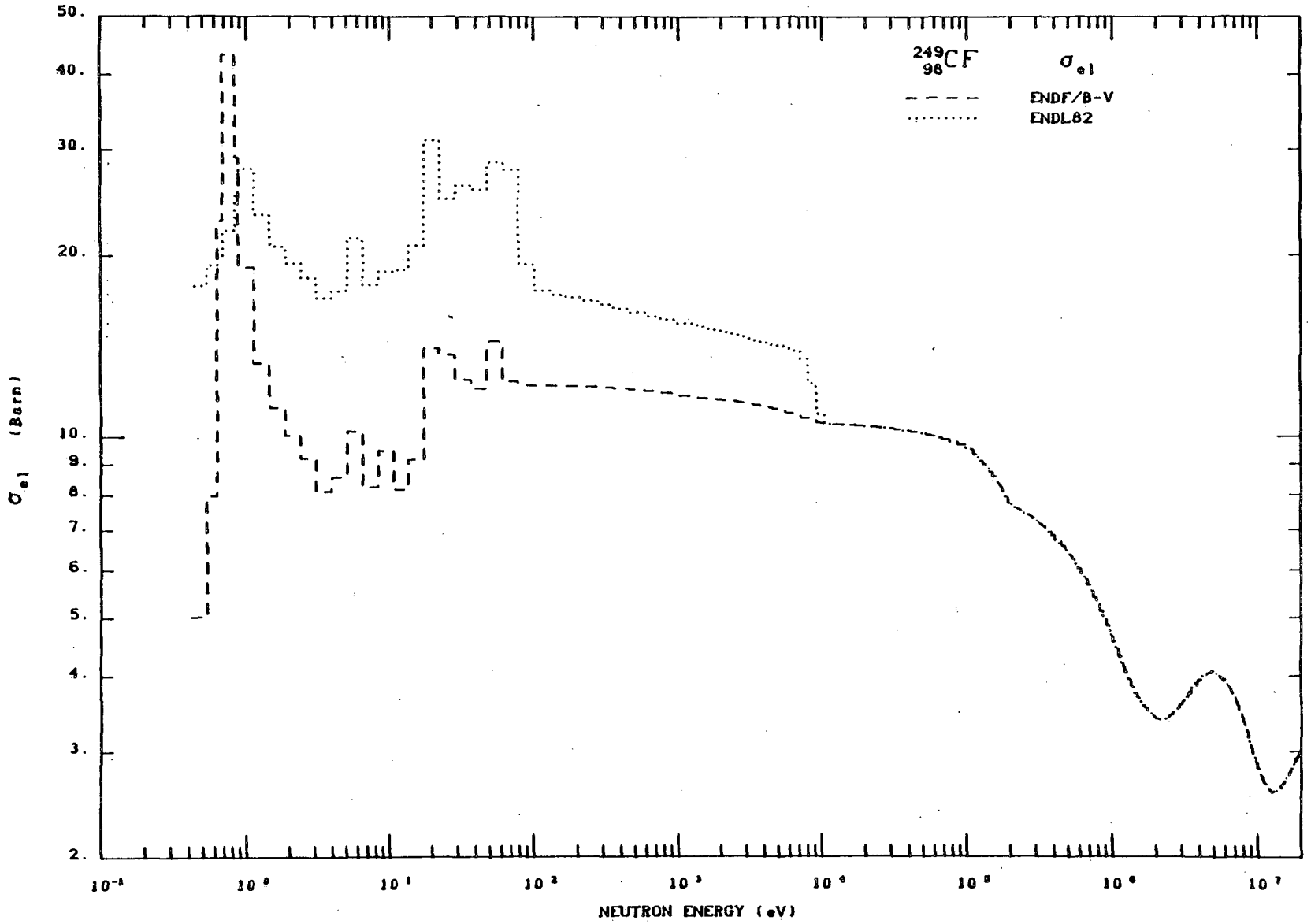
THERMAL CROSS SECTIONS (2200 m/s)

Reference	σ_γ	σ_f	σ_t	$\bar{\nu}_p$	(barns)
ENDL -82	478.4	1669	2159		
BNL 325 (1984)	497(Maxw)	1642		4.06	

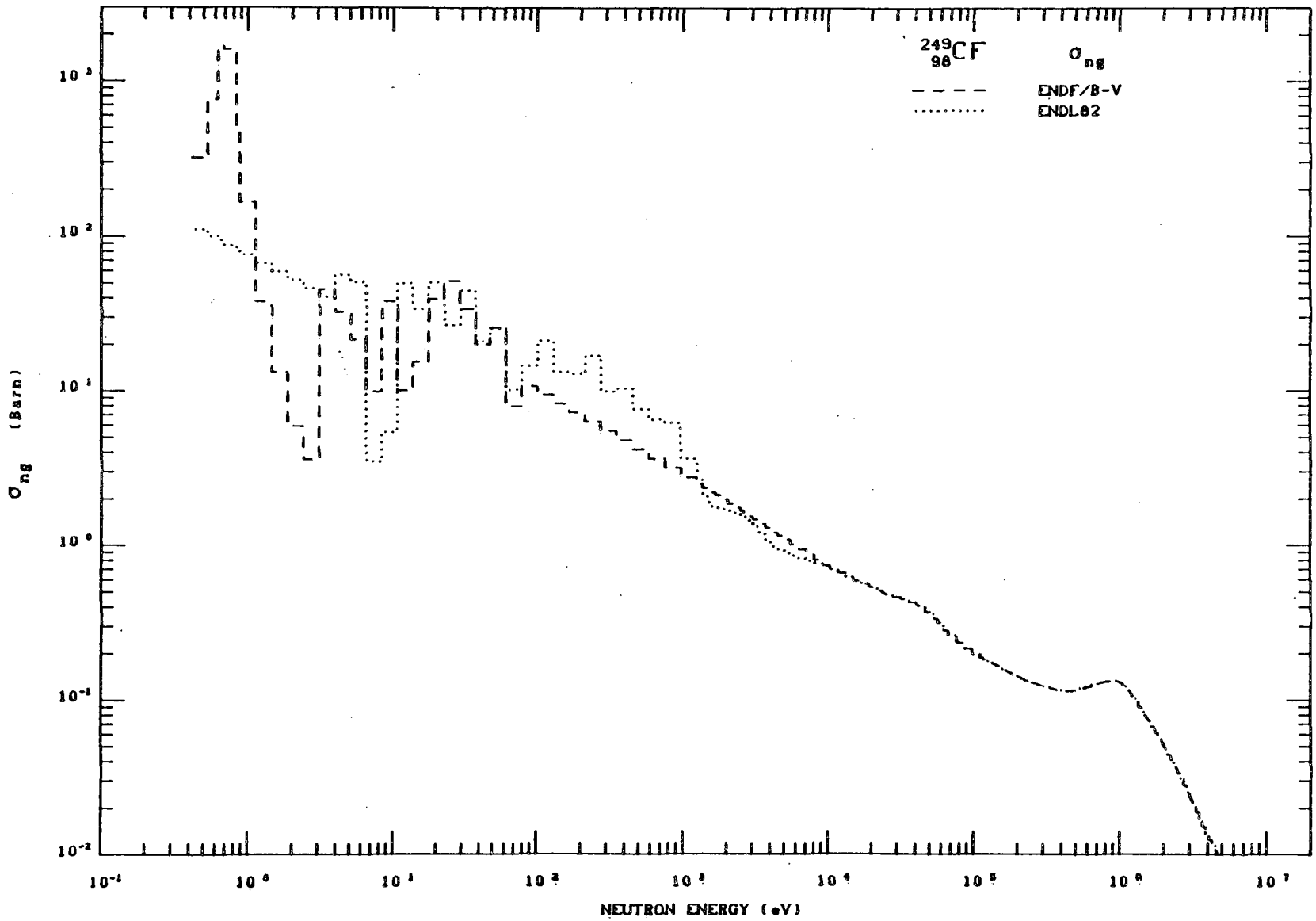
RESONANCE INTEGRALS

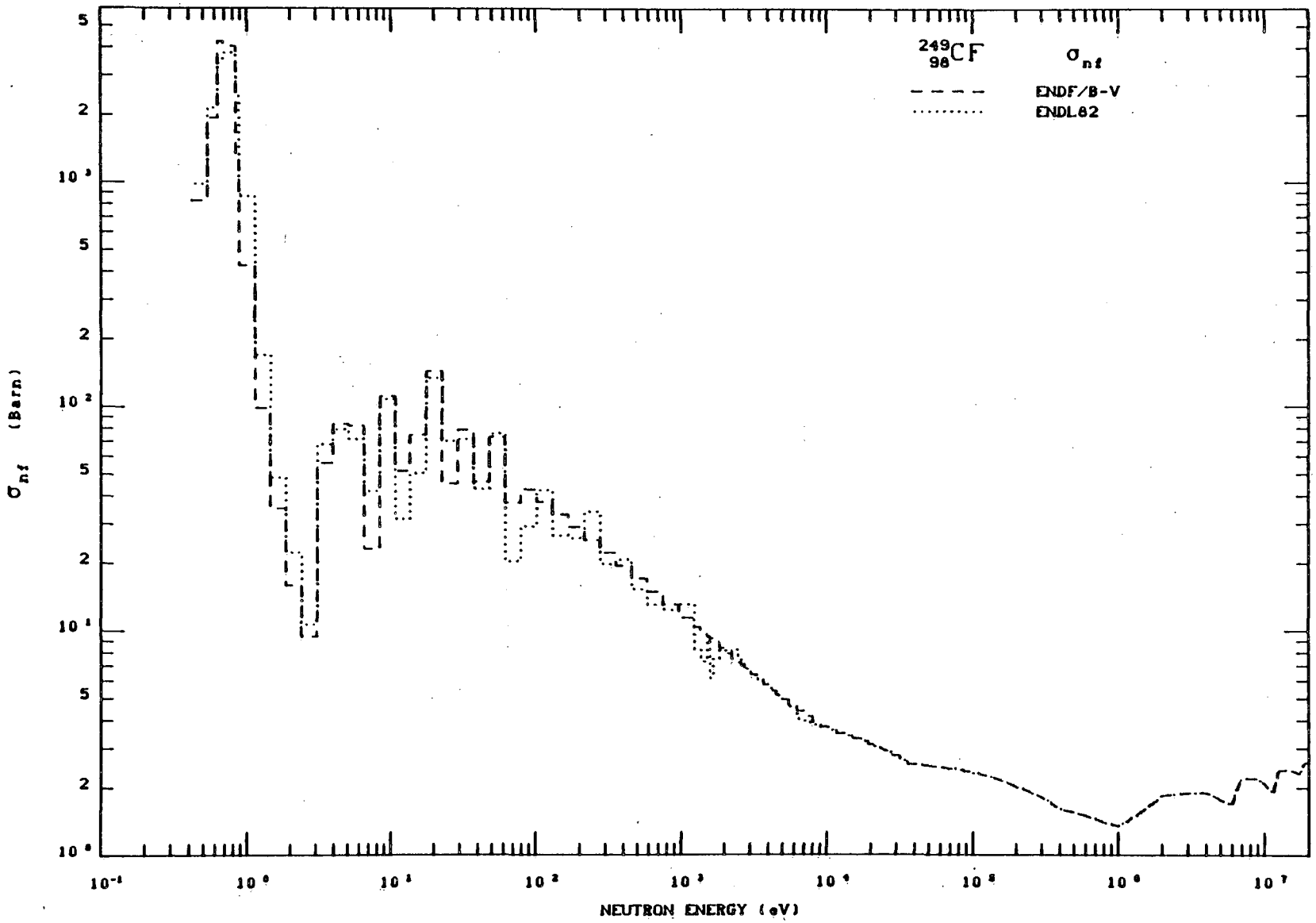
Reference	RI_γ	RI_f	(barns)
ENDL -82	266.8	2222	
BNL 325 (1984)	765	2380	


249 98 CF
σ tot
ENDF/B-V
ENDL82
σ tot (Barn)
NEUTRON ENERGY (eV)


$^{249}_{98}CF$
σ_{el}
ENDF/B-V
ENDL82
σ_{el} (Barn)
50.
40.
30.
20.
10.
9.
8.
7.
6.
5.
4.
3.
2.
10^{-1}
10^{0}
10^{1}
10^{2}
10^{3}
10^{4}
10^{5}
10^{6}
10^{7}
NEUTRON ENERGY (eV)

$^{249}_{98}Cf$


249
98 Cf
σng
ENDF/B-V
ENDL82
σng (Barn)
NEUTRON ENERGY (eV)


$^{249}_{98}$CF
σ_{nf}
ENDF/B-V
ENDL82
σ_{nf} (Barn)
NEUTRON ENERGY (eV)

^{250}Cf

NUCLEAR PROPERTIES

Spin and parity of ground state: 0^+

Ground state decay:

Alpha to ^{246}Cm.

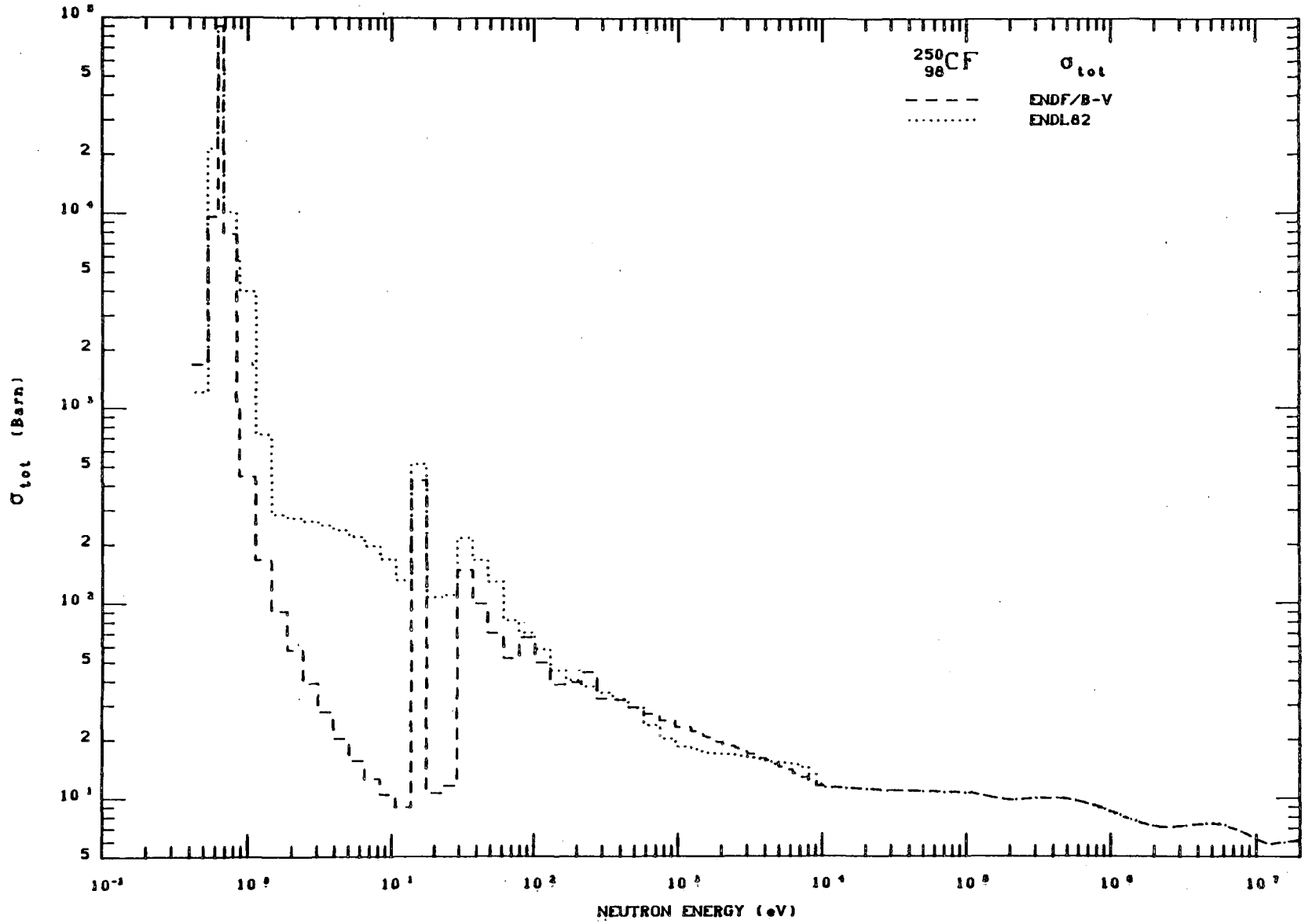
Half-life: 13.08 yr

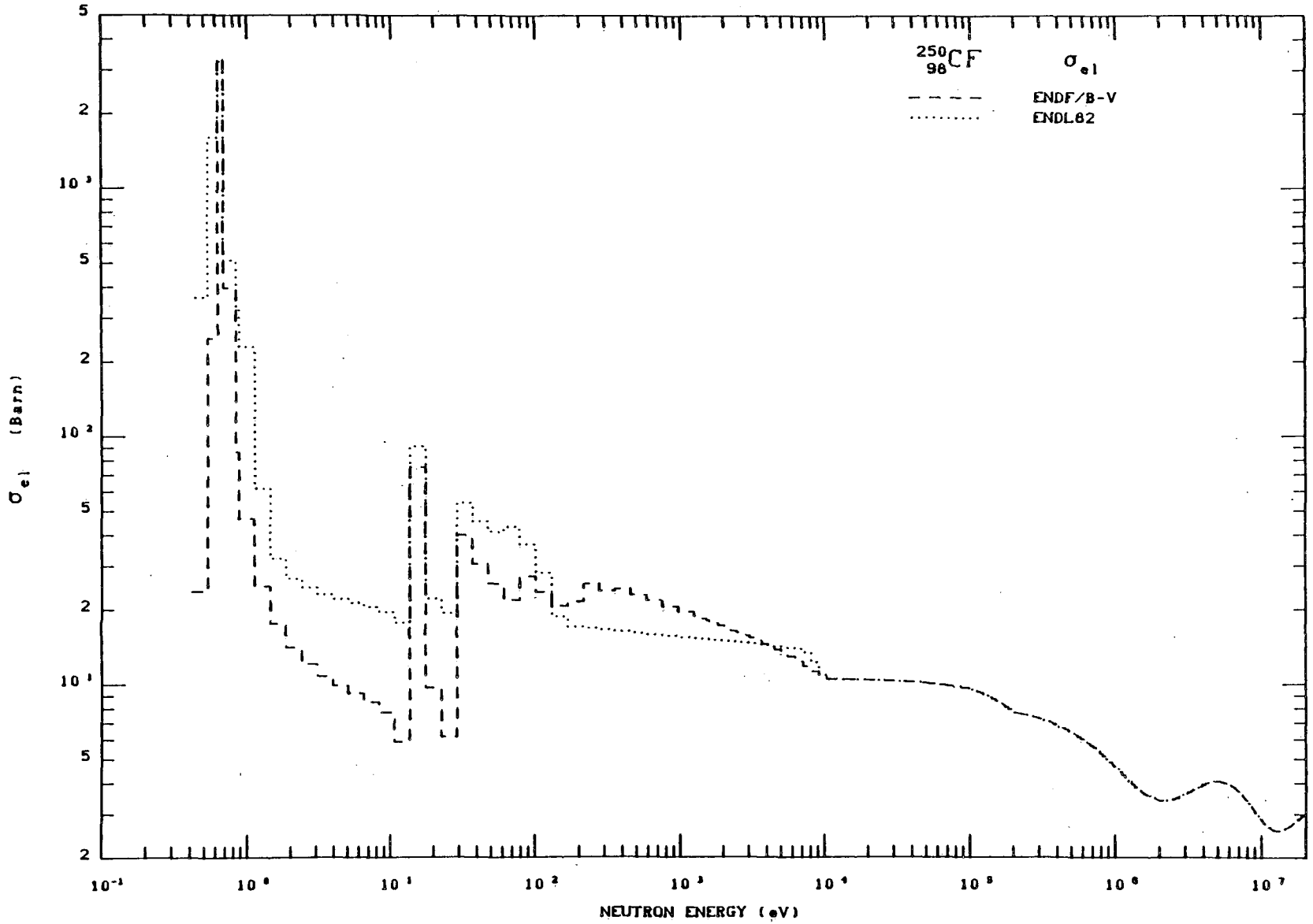
THERMAL CROSS SECTIONS (2200 m/s)

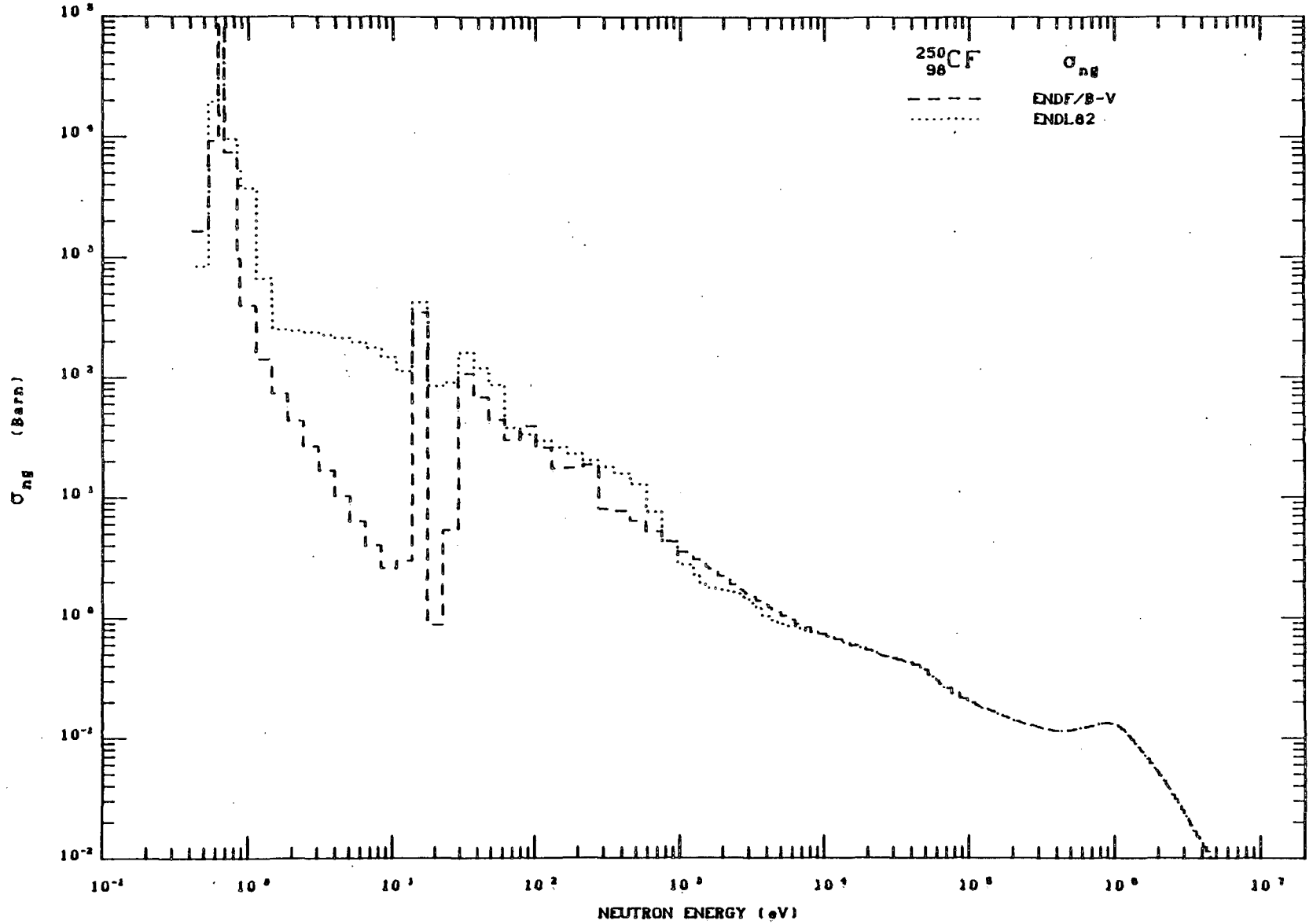
Reference	σ_γ	σ_f	σ_t	$\bar{\nu}_{sp}$	(barns)
ENDL -82	2003	0.100	2015		
BNL 325 (1984)	2034(Maxw)			3.51	

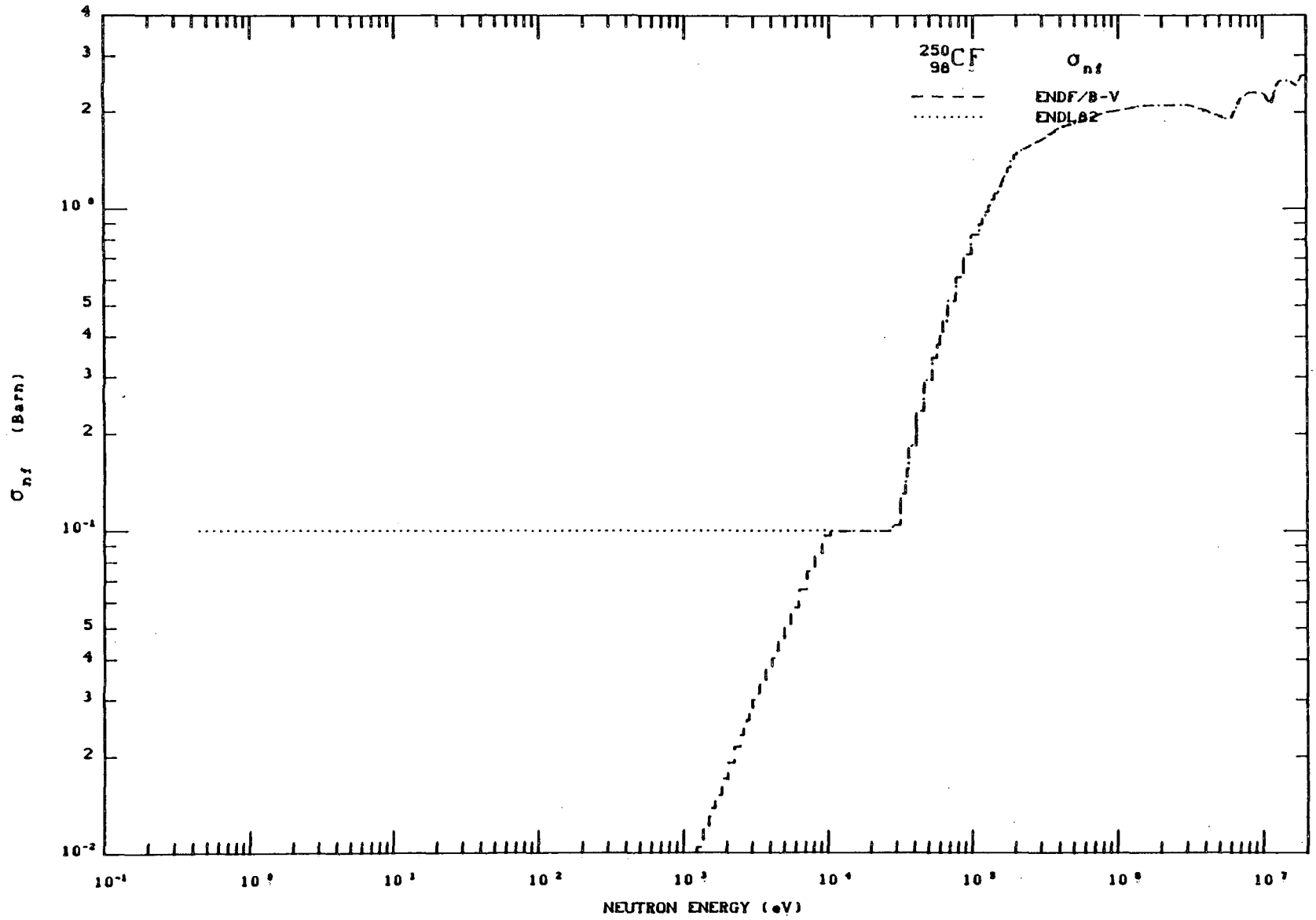
RESONANCE INTEGRALS

Reference	RI_γ	RI_f	(barns)
ENDL -82	14610	11.69	
BNL 325 (1984)	11600		


$^{250}_{98}$CF
σ_{tot}
ENDF/B-V
ENDL82
σ_{tot} (Barn)
NEUTRON ENERGY (eV)


$^{250}_{98}CF$
σ_{el}
ENDF/B-V
ENDL82
σ_{el} (Barn)
NEUTRON ENERGY (eV)


$^{250}_{98}$CF
σ_{ng}
ENDF/B-V
ENDL82
σ_{ng} (Barn)
NEUTRON ENERGY (eV)


$^{250}_{98}$CF
σ_{nf}
ENDF/B-V
ENDL82
σ_{nf} (Barn)
NEUTRON ENERGY (eV)

^{251}Cf

NUCLEAR PROPERTIES

Spin and parity of ground state: $1/2^+$

Ground state decay:

Alpha to ^{247}Cm

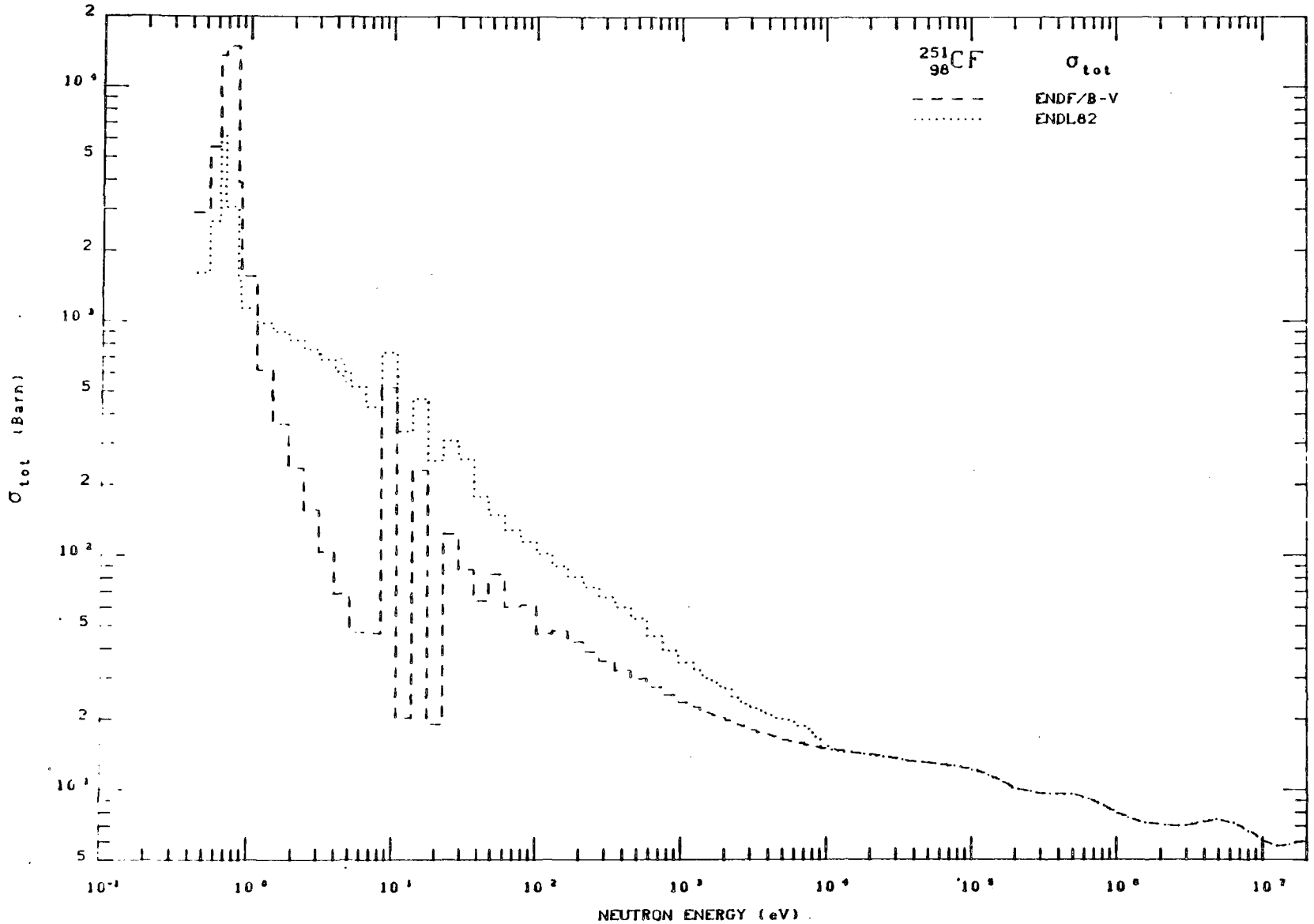
Half-life: 898 yr

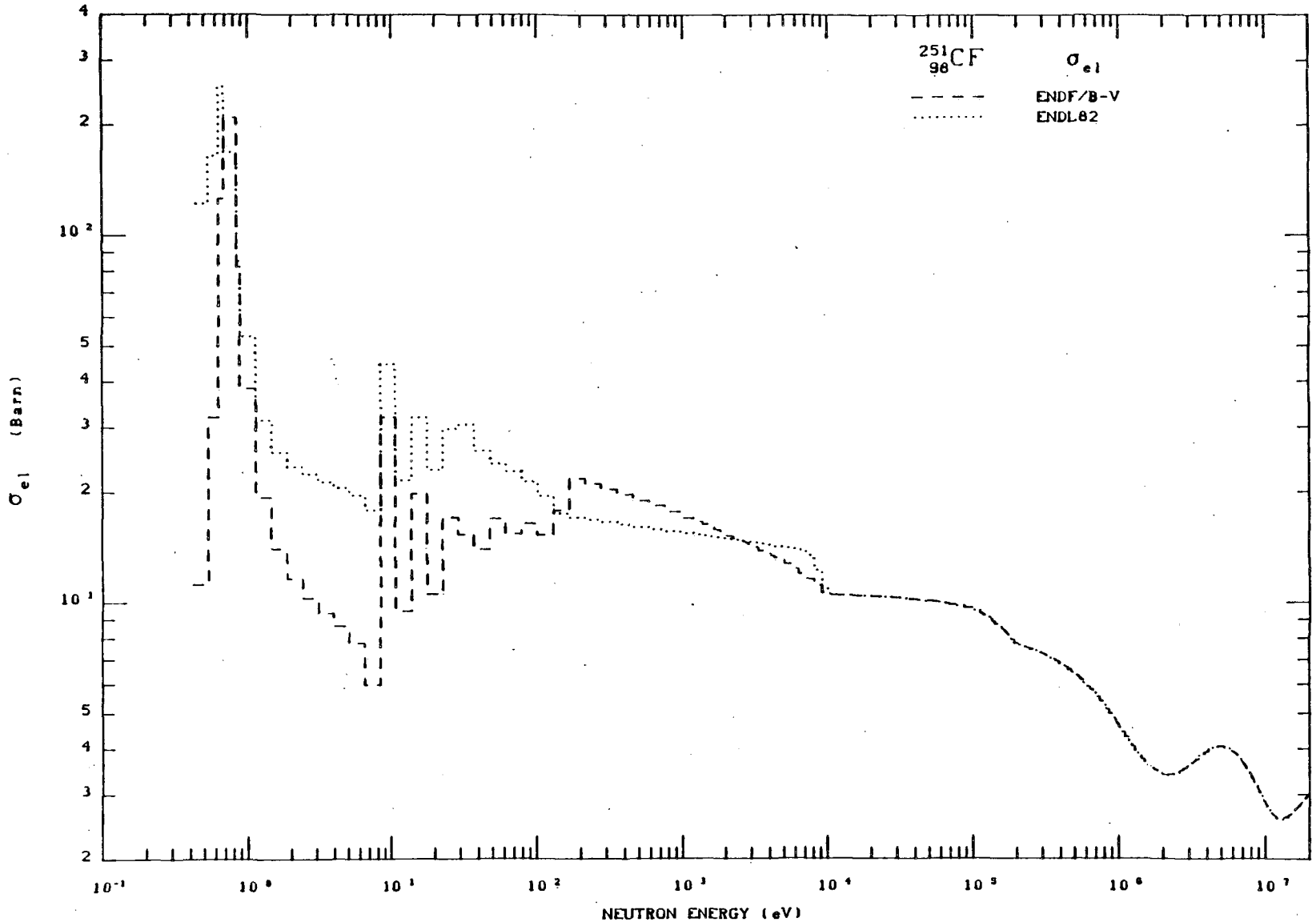
THERMAL CROSS SECTIONS (2200 m/s)

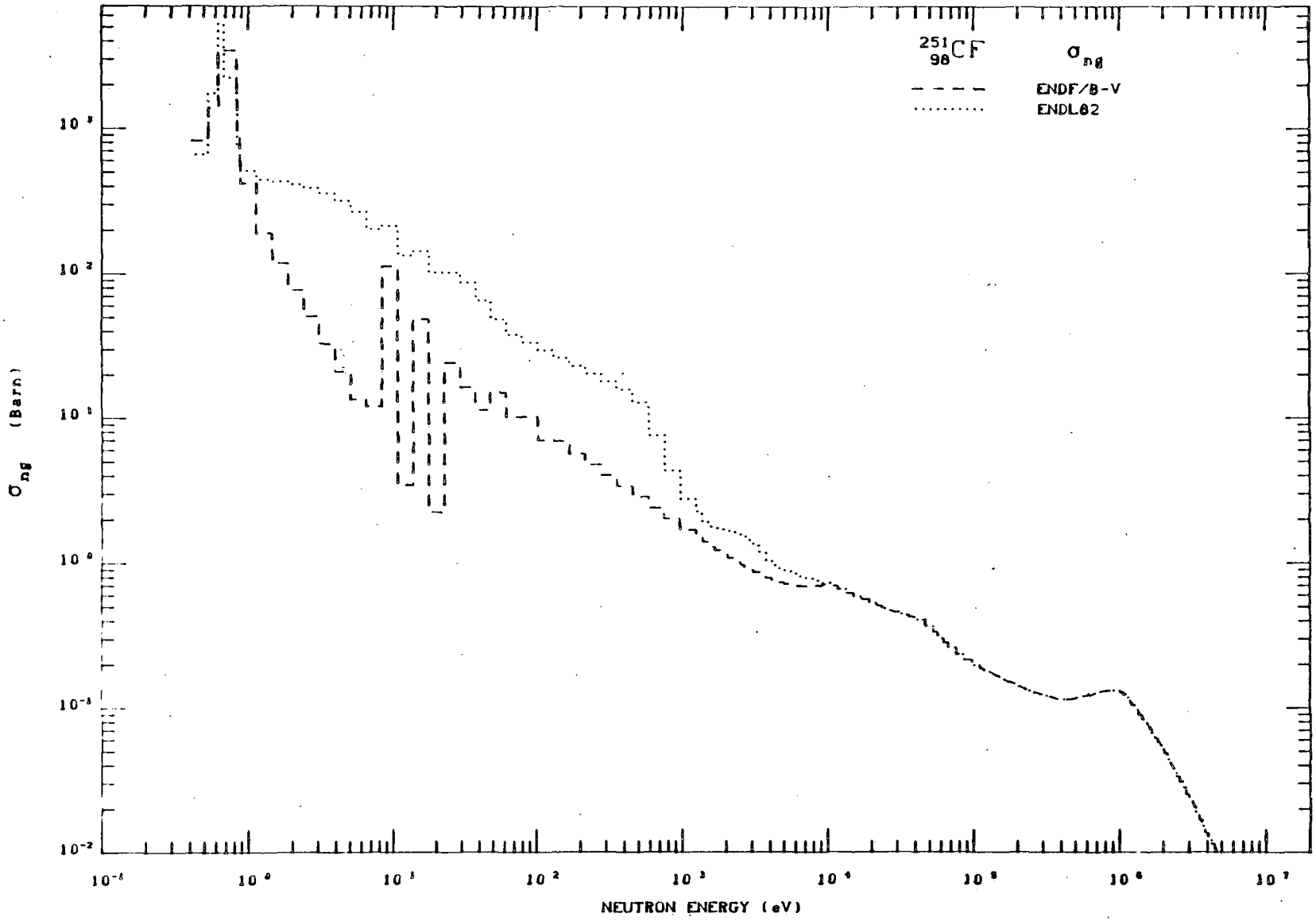
Reference	σ_γ	σ_f	σ_t	(barns)
ENDL -82	2854	3562	6427	
BNL 325 (1984)	2850(Maxw)	4895(Maxw)		

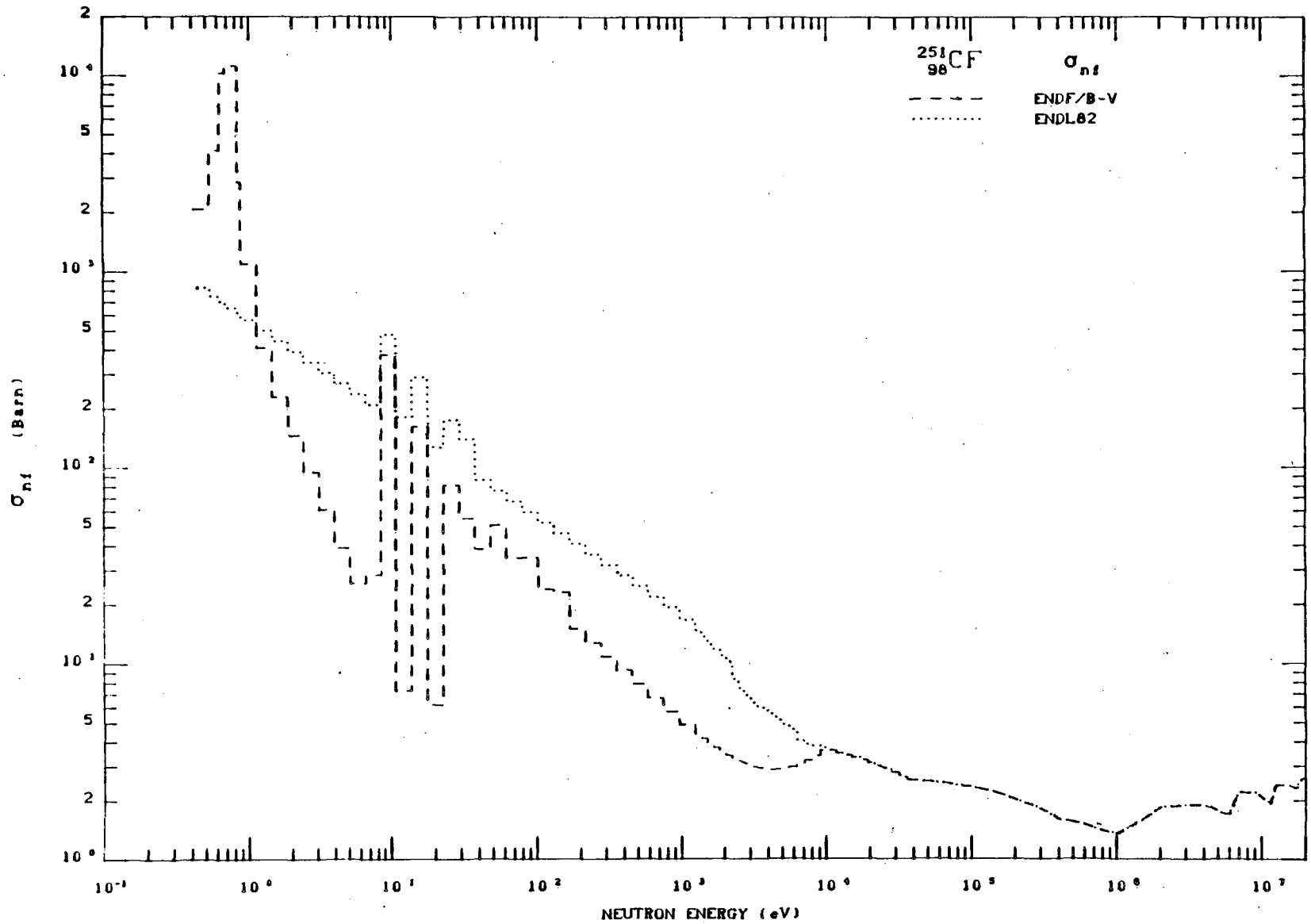
RESONANCE INTEGRALS

Reference	RI_γ	RI_f	(barns)
ENDL -82	2408	1744	
BNL 325 (1984)	1600	5900	


$^{251}_{98}$Cf
σ_{tot}
ENDF/B-V
ENDL82
σ_{tot} (Barn)
NEUTRON ENERGY (eV)


$^{251}_{98}$CF
σ_{el}
ENDF/B-V
ENDL82
σ_{el} (Barn)
NEUTRON ENERGY (eV)


$^{251}_{98}$CF
σ_{ng}
ENDF/B-V
ENDL82
σ_{ng} (Barn)
NEUTRON ENERGY (eV)


$^{251}_{98}$CF
σ_{nf}
ENDF/B-V
ENDL82
σ_{nf} (Barn)
NEUTRON ENERGY (eV)

$^{251}_{98}$Cf

^{252}Cf

NUCLEAR PROPERTIES

Spin and parity of ground state: 0^+

Ground state decay:

Alpha to ^{248}Cm: 96.91%

Spontaneous fission: 3.09%

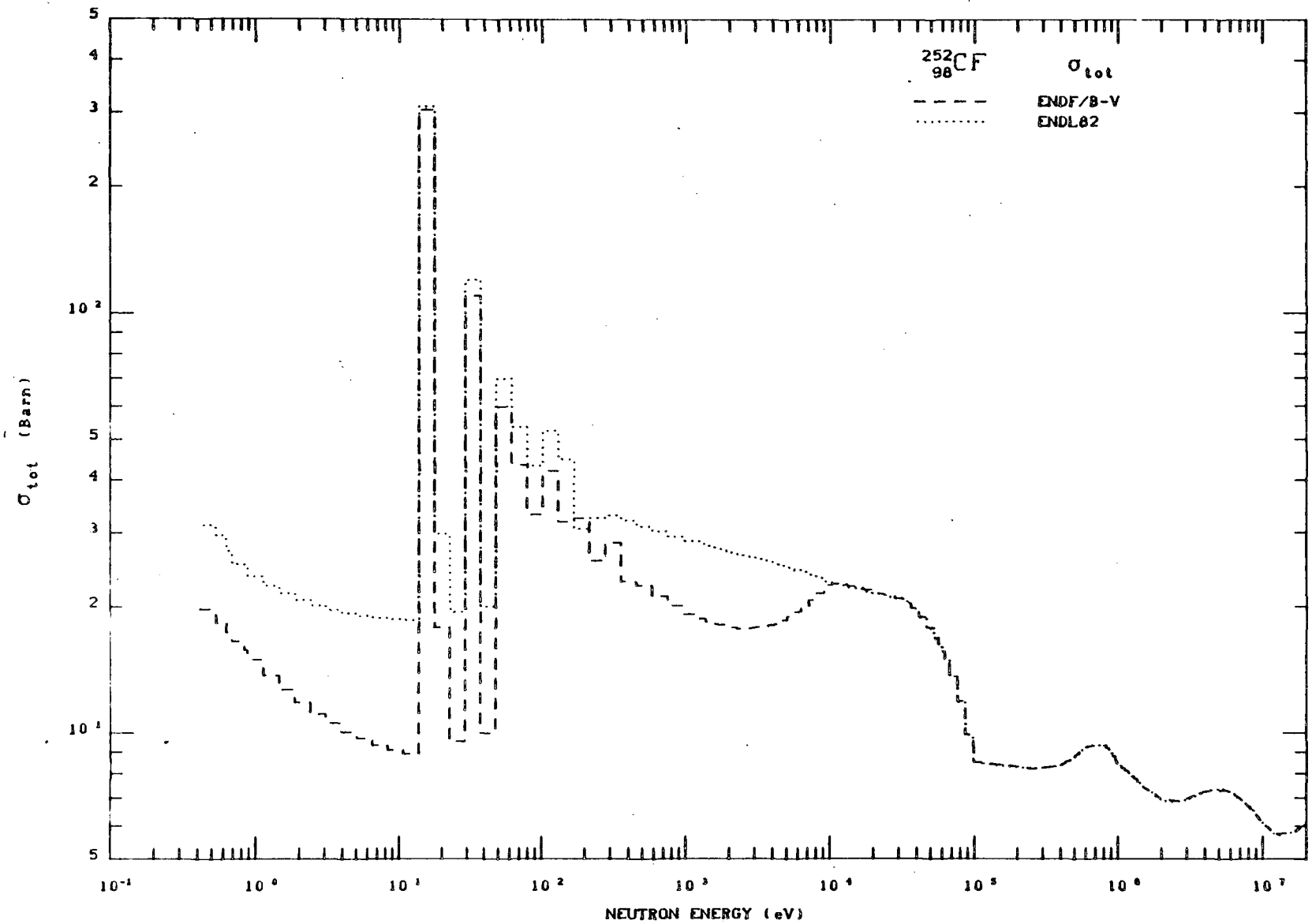
Half-life: 2.638 yr

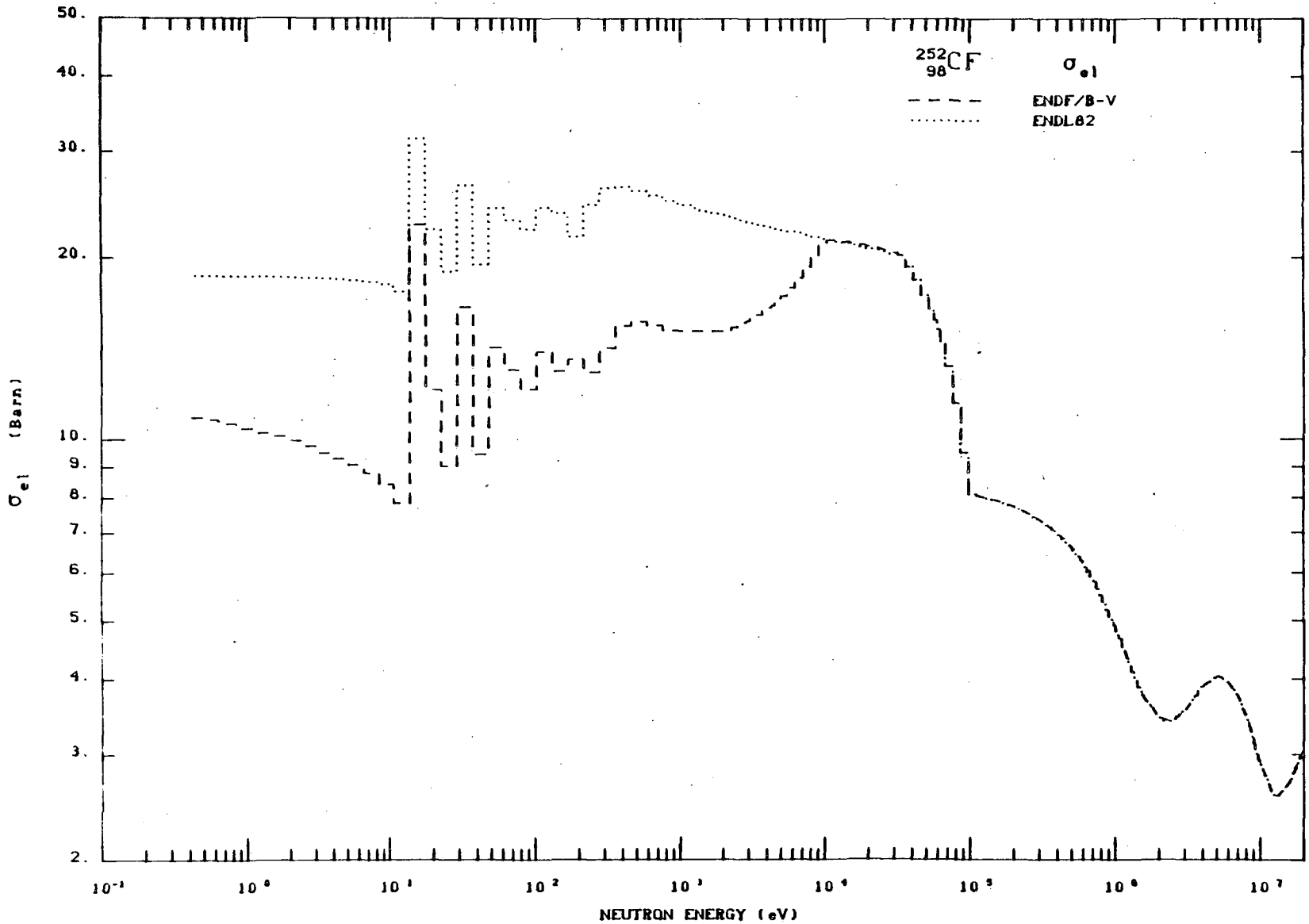
THERMAL CROSS SECTIONS (2200 m/s)

Reference	σ_γ barns	σ_f barns	σ_t barns	$\bar{\nu}_{sp}$
ENDF/B - V				3.766
ENDL -82	20.65	33.67	73.04	
BNL 325 (1984)	20.4	32		3.7675
NNDC (1983)				3.7661
84 NPL, AXTON				3.766

RESONANCE INTEGRALS

Reference	RI_γ barns	RI_f barns
ENDL -82	50.22	113.7
BNL 325 (1984)	43.5	110


$^{252}_{98}$CF
σ_{tot}
ENDF/B-V
ENDL82
σ_{tot} (Barn)
NEUTRON ENERGY (eV)


$^{252}_{98}$CF
σ_{el}
ENDF/B-V
ENDL82
σ_{el} (Barn)
NEUTRON ENERGY (eV)
50.
40.
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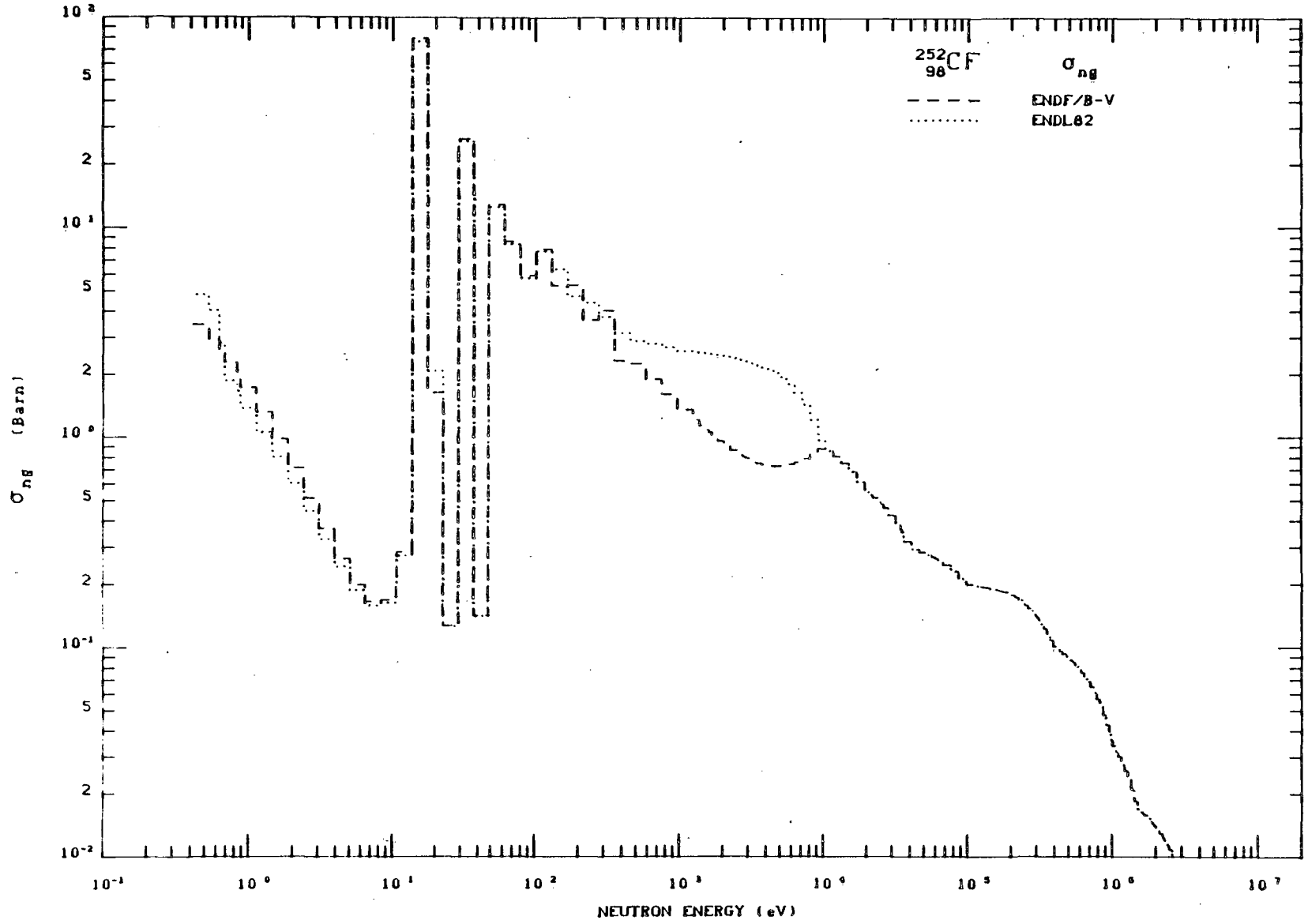
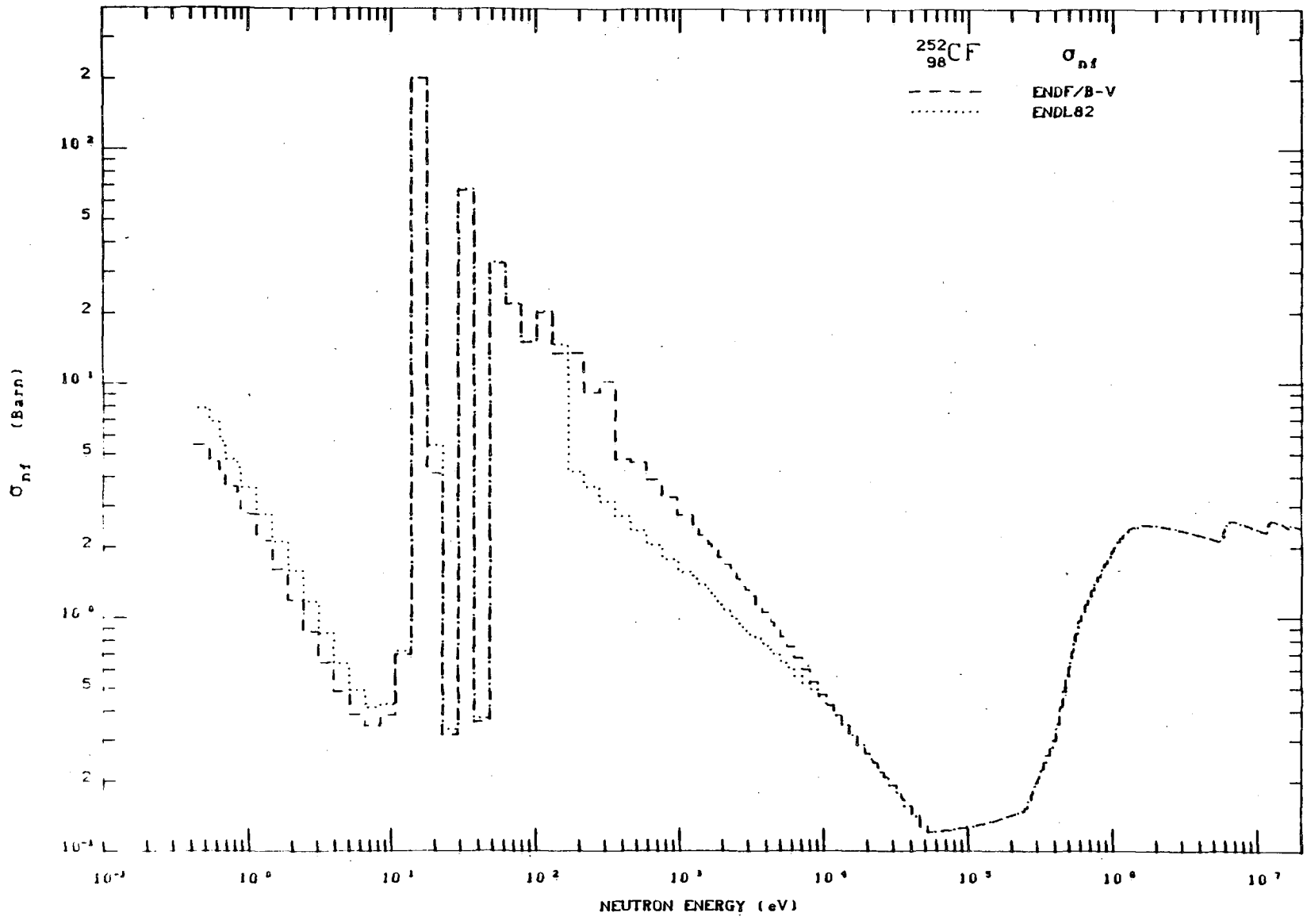
10^{0}
10^{1}
10^{2}
10^{3}
10^{4}
10^{5}
10^{6}
10^{7}

$^{252}_{98}$Cf


$^{252}_{98}$CF
σ_{ng}
ENDF/B-V
ENDL82
σ_{ng} (Barn)
NEUTRON ENERGY (eV)


$^{252}_{98}$CF
σ_{nf}
ENDF/B-V
ENDL82
σ_{nf} (Barn)
NEUTRON ENERGY (eV)

$^{252}_{98}$Cf