

JAERI-M
84-069

DATA ON COLLISIONS OF HELIUM ATOMS
AND IONS WITH ATOMS AND MOLECULES (II)

(CROSS SECTIONS FOR CHARGE TRANSFER
OF He^{2+} , He^+ , He AND He^- WITH He , Ne , Ar ,
 Kr AND Xe)

April 1984

Yohta NAKAI, Akira KIKUCHI*, Toshizo SHIRAI
and Masao SATAKA.

日本原子力研究所
Japan Atomic Energy Research Institute

JAERI-M レポートは、日本原子力研究所が不定期に公刊している研究報告書です。

入手の間合わせは、日本原子力研究所技術情報部情報資料課（〒319-11 茨城県那珂郡東海村）あて、お申しこしください。なお、このほかに財団法人原子力弘済会資料センター（〒319-11 茨城県那珂郡東海村 日本原子力研究所内）で複写による実費頒布をおこなっております。

JAERI-M reports are issued irregularly.

Inquiries about availability of the reports should be addressed to Information Section, Division of Technical Information, Japan Atomic Energy Research Institute, Tokai-mura, Naka-gun, Ibaraki-ken 319-11, -Japan.

© Japan Atomic Energy Research Institute, 1984

編集兼発行 日本原子力研究所
印刷 日立高速印刷株式会社

Data on Collisions of Helium Atoms and Ions
with Atoms and Molecules (II)
(Cross Sections for Charge Transfer of He^{2+} , He^+ , He and He^-
with He, Ne, Ar, Kr and Xe)

Yohta NAKAI, Akira KIKUCHI*, Toshizo SHIRAI
and Masao SATAKA

Department of Physics, Tokai Research Establishment, JAERI

(Received March 1, 1984)

This report presents a compilation of the experimental data on cross sections for charge transfer of He^{2+} , He^+ , He and He^- with inert gases such as He, Ne, Ar, Kr and Xe.

A survey has been made systematically of the literatures up to the end of 1983. The cross sections are given as a function of projectile energy in graphs and tables, and a list of references is also attached.

Keywords: Charge Transfer, Helium Ion, Helium Atom, Inert Gas, Helium
Ash, Atomic Data, Atomic Collision

* Faculty of Engineering, Ibaraki University.

ヘリウム原子・イオンと原子分子の衝突に関するデータ集(II)
(He^{2+} , He^+ , He および He^- , と He , Ne , Ar , Kr および Xe の電
荷移動断面積)

日本原子力研究所東海研究所物理部
中井 洋太・菊地 昭*・白井 稔三・左高 正雄

(1984年3月1日受理)

この報告書は、 He^{2+} , He^+ , He および He^- と He , Ne , Ar , Kr および Xe などの希ガスの電荷移動断面積の実験データを収集したものである。すなわち、上述の過程の1983年末までに発表された文献を調べ、その結果をまとめたものである。断面積の値を入射粒子のエネルギーの関数としてグラフおよび数値表の形にまとめ、これに文献リストを付している。

* 協力研究員, 茨城大学工学部

Contents

1. Introduction	1
2. Data on Charge Transfer Cross Sections	3
2.1 Table of Compiled Processes	3
2.2 References for Data	5
2.3 Lists of Experimental Data for σ_{0-1} , σ_{10} , σ_{1-1} , σ_{21} , σ_{20} , σ_{-10} , σ_{1-1} , σ_{01} , σ_{02} and σ_{12}	12
2.4 Graphs and Tables of Cross Sections	17

目 次

1. 緒 論	1
2. 電荷移動断面積のデータ	3
2.1 収集した過程の表	3
2.2 データの文献	5
2.3 σ_{0-1} , σ_{10} , σ_{1-1} , σ_{21} , σ_{20} , σ_{-10} , σ_{1-1} , σ_{01} , σ_{02} および σ_{12} の実験データのリスト	12
2.4 断面積のグラフおよび表	17

1. Introduction

Atomic and molecular processes have a major role in many fields such as radiation physics, astrophysics, medical science and so on. Especially the processes are crucial to plasma modelling, diagnostics and design of devices¹⁾. The charge transfer process is the most determining one among the atomic and molecular processes in fusion plasma.

In the previous reports, the compilations were performed on the charge transfer cross sections for (1) He, He⁺ and He²⁺ incident on H, H₂ and He²⁾, (2) H, H⁺ and H⁻ on H₂, N₂, O₂, H₂O, C and carbon containing molecules³⁾, and (3) H, H⁺ and H⁻ on inert gases⁴⁾.

In this report a compilation is carried out for the charge transfer cross sections of He²⁺, He⁺, He and He⁻ incident on inert gases such as He, Ne, Ar, Kr and Xe.

These collision processes and cross section data are of importance especially in relation to the plasma modelling and diagnostics for several reasons. Fast atomic beam probes of inert gases can provide useful information on plasma ion densities and temperature. The exhaust of the helium gas produced in the D-T fusion processes is also the problem to be resolved. In this respect inert gases can be employed for wall protection by increasing plasma edge cooling. Thus the knowledge of charge transfer cross sections for the inert gases is indispensable to the elucidation of atomic and molecular problems.

This report presents a compilation in graphs and tables of the experimental cross sections for charge transfer of He²⁺, He⁺, He and He⁻ with He, Ne, Ar, Kr and Xe. The literatures up to the end of 1983 are surveyed for the present compilation.

The numerical data are stored in the Atomic and Molecular Data Storage and Retrieval System (AMSTOR) of JAERI, being available to interested users on magnetic tape for their requests.

References for Introduction

- 1) Drawin H.W. and Katsonis K. ed.: Atomic and Molecular Data for Fusion, *Physica Scripta* 23, 69 (1981).
- 2) Nakai Y., Sataka M. and Shirai T.: JAERI-M 8849 (1980).
- 3) Nakai Y., Kikuchi A., Shirai T. and Sataka M.: JAERI-M 83-013 (1983).
- 4) Nakai Y., Kikuchi A., Shirai T. and Sataka M.: JAERI-M 83-143 (1983).

2. Data on Charge Transfer Cross Sections

2.1 Table of Compiled Processes

Table 2.1.1 Compiled Processes

Type of Cross Sections	Processes	
I. Electron Capture		
σ_{0-1}	$\text{He} + \text{He} \rightarrow \text{He}^-$	No data
	(1) $\text{He} + \text{Ne} \rightarrow \text{He}^-$	
	(2) $\text{He} + \text{Ar} \rightarrow \text{He}^-$	
	(3) $\text{He} + \text{Kr} \rightarrow \text{He}^-$	
	(4) $\text{He} + \text{Xe} \rightarrow \text{He}^-$	
σ_{10}	(5) $\text{He}^+ + \text{He} \rightarrow \text{He}$	
	(6) $\text{He}^+ + \text{Ne} \rightarrow \text{He}$	
	(7) $\text{He}^+ + \text{Ar} \rightarrow \text{He}$	
	(8) $\text{He}^+ + \text{Kr} \rightarrow \text{He}$	
	(9) $\text{He}^+ + \text{Xe} \rightarrow \text{He}$	
σ_{1-1}	$\text{He}^+ + \text{He} \rightarrow \text{He}^-$	No data
	(10) $\text{He}^+ + \text{Ne} \rightarrow \text{He}^-$	
	(11) $\text{He}^+ + \text{Ar} \rightarrow \text{He}^-$	
	(12) $\text{He}^+ + \text{Kr} \rightarrow \text{He}^-$	
	(13) $\text{He}^+ + \text{Xe} \rightarrow \text{He}^-$	
σ_{21}	(14) $\text{He}^{2+} + \text{He} \rightarrow \text{He}^+$	
	(15) $\text{He}^{2+} + \text{Ne} \rightarrow \text{He}^+$	
	(16) $\text{He}^{2+} + \text{Ar} \rightarrow \text{He}^+$	
	(17) $\text{He}^{2+} + \text{Kr} \rightarrow \text{He}^+$	
	$\text{He}^{2+} + \text{Xe} \rightarrow \text{He}^+$	No data
σ_{20}	(18) $\text{He}^{2+} + \text{He} \rightarrow \text{He}$	
	(19) $\text{He}^{2+} + \text{Ne} \rightarrow \text{He}$	
	(20) $\text{He}^{2+} + \text{Ar} \rightarrow \text{He}$	
	(21) $\text{He}^{2+} + \text{Kr} \rightarrow \text{He}$	
	$\text{He}^{2+} + \text{Xe} \rightarrow \text{He}$	No data
σ_{2-1}		No data

Table 2.1.1 Compiled Processes (Continued)

Type of Cross Sections	Processes	
II. Electron Loss		
σ_{-10}	(22) $\text{He}^- + \text{He} \rightarrow \text{He}$	
	(23) $\text{He}^- + \text{Ne} \rightarrow \text{He}$	
	(24) $\text{He}^- + \text{Ar} \rightarrow \text{He}$	
	$\text{He}^- + \text{Kr} \rightarrow \text{He}$	No data
	$\text{He}^- + \text{Xe} \rightarrow \text{He}$	No data
σ_{-11}	(25) $\text{He}^- + \text{He} \rightarrow \text{He}^+$	
	(26) $\text{He}^- + \text{Ne} \rightarrow \text{He}^+$	
	(27) $\text{He}^- + \text{Ar} \rightarrow \text{He}^+$	
	$\text{He}^- + \text{Kr} \rightarrow \text{He}^+$	No data
	$\text{He}^- + \text{Xe} \rightarrow \text{He}^+$	No data
σ_{-12}		No data
σ_{01}	(28) $\text{He} + \text{He} \rightarrow \text{He}^+$	
	(29) $\text{He} + \text{Ne} \rightarrow \text{He}^+$	
	(30) $\text{He} + \text{Ar} \rightarrow \text{He}^+$	
	(31) $\text{He} + \text{Kr} \rightarrow \text{He}^+$	
	(32) $\text{He} + \text{Xe} \rightarrow \text{He}^+$	
σ_{02}	(33) $\text{He} + \text{He} \rightarrow \text{He}^{2+}$	
	$\text{He} + \text{Ne} \rightarrow \text{He}^{2+}$	No data
	(34) $\text{He} + \text{Ar} \rightarrow \text{He}^{2+}$	
	(35) $\text{He} + \text{Kr} \rightarrow \text{He}^{2+}$	
	$\text{He} + \text{Xe} \rightarrow \text{He}^{2+}$	No data
σ_{12}	(36) $\text{He}^+ + \text{He} \rightarrow \text{He}^{2+}$	
	(37) $\text{He}^+ + \text{Ne} \rightarrow \text{He}^{2+}$	
	(38) $\text{He}^+ + \text{Ar} \rightarrow \text{He}^{2+}$	
	(39) $\text{He}^+ + \text{Kr} \rightarrow \text{He}^{2+}$	
	$\text{He}^+ + \text{Xe} \rightarrow \text{He}^{2+}$	No data

Note: Numbers indicated in processes correspond to the numbers of figures and tables of cross section data.

2.2 References for Data

1. Afrosimov V.V., Leiko G.A., Mamaev Yu.A. and Panov M.N.
Sov. Phys. JETP 40, 661 (1975)
Elementary processes of variation of particle charge states in He^{2+} - He interaction
2. Allison S.K.
Phys. Rev. 109, 76 (1958)
Double electron capture and loss by helium ions traversing gases
3. Allison S.K., Cuevas J. and Murphy P.J.
Phys. Rev. 102, 76 (1956)
Experimental cross sections for charge-changing collisions of He^+ and He^{++} ions traversing gases
4. Barnett C.F. and Stier P.M.
Phys. Rev. 109, 385 (1958)
Charge exchange cross sections for helium ions in gases
5. Baragiola R.A. and Nemirovsky I.B.
Nucl. Instr. Meth. 110, 511 (1973)
Cross sections for single and double electron capture from He^{++} on hydrogen, neon and argon
6. Bayfield J.E. and Khayrallah G.A.
Phys. Rev. A11, 920 (1975)
Electron transfer in keV-energy $^4\text{He}^{++}$ atomic collisions. I. single and double electron transfer with He, Ar, H_2 , and N_2
7. Belyaev V.A., Breznev B.G. and Erastov E.M.
Sov. Phys. JETP 27, 924 (1968)
Resonant charge transfer of low-energy carbon and nitrogen ions

8. Berkner K.H., Pyle R.V., Stearns J.W. and Warren J.C.
 Phys. Rev. 166, 44 (1968)
 Single- and double-electron capture by 7.2- to 181-keV $^3\text{He}^{++}$
 ions in He

9. Cramer W.H. and Simons J.H.
 J. Chem. Phys. 26, 1272 (1957)
 Elastic and inelastic scattering of low-velocity He^+ ions in
 helium

10. de Heer F.J., Schutten J. and Moustafa H.
 Physica 32, 1973 (1966)
 Ionization and electron capture for helium ions incident on
 noble and diatomic gases between 10 and 150 keV

11. Dillon J.A.Jr., Sheridan W.F., Edwards H.D. and Ghosh S.N.
 J. Chem. Phys. 23, 776 (1955)
 Charge transfer reactions in monatomic and diatomic gases

12. Dmitriev I.S., Nikolaev V.S., Fateeva L.N. and Teplova Ya.A.
 Sov. Phys. JETP 15, 11 (1962)
 Experimental study of electron loss by multiply charged ions
 in gases

13. Fedorenko N.V., Afrosimov V.V. and Kaminker D.M.
 Sov. Phys. Tech. Phys. 1, 1861 (1956)
 Electron capture and ionization in the interaction of singly
 charged positive ions with gas atoms

14. Fogel' Ya.M., Ankudinov V.A. and Pilipenko D.V.
 Sov. Phys. JETP 11, 18 (1960)
 Electron capture and detachment in collisions of fast helium,
 boron, and fluorine atoms with gas molecules

15. Eisele F.L. and Nagy S.W.
J. Chem. Phys. 65, 752 (1976)
Attenuation and single electron charge-exchange cross sections of He^+ on He in the energy range 500-5000 eV
16. Eisele F.L. and Nagy S.W.
J. Chem. Phys. 66, 883 (1977)
Attenuation and single electron charge-exchange cross sections of He^+ on Ne and Ar in the 500-5000 eV energy range
17. Gilbody H.B., Dunn K.F., Browning R. and Latimer C.J.
J. Phys. B3, 1105 (1970)
Electron loss from fast metastable and ground state helium atoms in passage through gaseous targets
18. Gilbody H.B., Dunn K.F., Browning R. and Latimer C.J.
J. Phys. B4, 800 (1971)
Formation of metastable helium atoms by electron capture during the passage of fast He^+ ions through gases
19. Hayden H.C. and Utterback N.G.
Phys. Rev. 135, A1575 (1964)
Ionization of helium, neon, and nitrogen by helium atoms
20. Heinemeier J., Hvelplund P. and Simpson F.R.
J. Phys. B8, 1880 (1975)
One- and two-electron-loss cross sections from He^- ions in hydrogen, helium and argon
21. Heinemeier J., Hvelplund P. and Simpson F.R.
J. Phys. B9, 2669 (1976)
Collisional detachment cross sections for H^- and He^- at high energies

22. Helm H.
J. Phys. B10, 3683 (1977)
The cross section for symmetric charge exchange of He^+ in He
at energies between 0.3 and 8 eV
23. Hvelplund P. and Pedersen E.H.
Phys. Rev. A9, 2434 (1974)
Single and double electron loss by fast helium atoms in gases
24. Hvelplund P., Heinemeier J., Pedersen E.H. and Simpson F.R.
J. Phys. B9, 491 (1976)
Electron capture by fast He^{2+} ions in gases
25. Jones P.R., Ziemba F.P., Moses H.A. and Everhart E.
Phys. Rev. 113, 182 (1959)
Total cross sections for multiple electron stripping in atomic
collisions at energies to 100 keV
26. Koopman D.W.
Phys. Rev. 154, 79 (1967)
Measurement of charge-exchange cross sections for H^+ , H_2^+ , and
 He^+ ions
27. Kranser S.
Phys. Rev. 99, 520 (1955)
Electron loss cross sections for helium atoms passing through
gases
28. Latypov Z.Z. and Shaporenko A.A.
Sov. Phys. Tech. Phys. 19, 976 (1975)
Scattering of He^+ ions by the core of He atom
29. Mahadevan P. and Magnuson G.D.
Phys. Rev. 171, 103 (1968)
Low-energy (1- to 100-eV) charge-transfer cross section
measurements for noble-gas-ion collisions with gases

30. Melchior K. and Papkow A.
 Phys. Lett. 8, 178 (1964)
 Bildung Negativer Heliumionen beim Durchgang durch Edelgase

31. Moran T.F. and Conrads R.J.
 J. Chem. Phys. 58, 3793 (1973)
 Charge neutralization of He⁺ ion beams

32. Nagy S.W., Savola W.J.Jr. and Pollack E.
 Phys. Rev. 177, 71 (1969)
 Measurement of the total cross section for symmetric charge
 exchange in helium from 400-2000 eV

33. Nicholas D.J., Trowbridge C.W. and Allen W.D.
 Phys. Rev. 167, 38 (1968)
 Lifetime of a negative helium ion

34. Nikolaev V.S, Dmitriev I.S., Fateeva L.N. and Teplova Ya. A.
 Sov. Phys. JETP 13, 695 (1961)
 Experimental investigation of electron capture by multiply
 charged ions

35. Nikolaev V.S, Fateeva L.N., Dmitriev I.S. and Teplova Ya. A.
 Sov. Phys. JETP 14, 67 (1962)
 Capture of several electrons by fast multicharged ions

36. Noda N.
 J. Phys. Soc. Jpn. 41, 625 (1976)
 Electron stripping of He and H in helium, hydrogen and
 nitrogen gases from 0.2 keV to 5.0 keV

37. Pedersen E.H. and Hvelplund P.
 J. Phys. B7, 132 (1974)
 Single-electron loss by fast (0.02-4 MeV) helium atoms in H₂
 and He gases

38. Pedersen E.H., Larsen L. and Mikkelsen J.
 J. Phys. B10, L669 (1977)
 Structure in electron-loss cross sections for fast light atoms
 in xenon
39. Pedersen E.H., Heinemeier J., Larsen L. and Mikkelsen J.
 J. Phys. B13, 1167 (1980)
 Electron-loss cross sections for fast, metastable and ground-
 state helium atoms in gases and metal vapours
40. Pivovarov L.I., Tubaev V.M. and Novikov M.T.
 Sov. Phys. JETP 14, 20 (1962)
 Electron loss and capture by 200-1500 keV helium ions in
 various gases
41. Pivovarov L.I., Novikov M.T. and Tubaev V.M. (a)
 Sov. Phys. JETP 15, 1035 (1962)
 Electron capture by helium ions in various gases in the 300-
 1500 keV energy range
42. Ryding G., Wittkower A.B. and Rose P.H.
 Phys. Rev. 174, 149 (1968)
 Measurement of one- and two-electron-loss cross sections for
 He-ions in H₂, He, and Ne gases (400-1500 keV)
43. Schlumbohm H.
 Z. Naturforsch. 24a, 1716 (1969)
 Ladungsaustausch zwischen Ionen und Atomen der Edelgase bei
 Stossenergien unterhalb 200 eV
44. Shelton W.N. and Stoycheff P.A.
 Phys. Rev. A3, 613 (1971)
 Measurement of the total cross section for single-electron
 transfer in collisions of He⁺ with He in the energy range 2-
 22 keV

45. Shah M.B. and Gilbody H.B.
J. Phys. B7, 256 (1974)
Formation of $\text{He}^+(2S)$ metastable ions in passage of 10-60 keV ${}^3\text{He}^{2+}$ ions through gases
46. Shah M.B. and Gilbody H.B.
J. Phys. B8, 372 (1975)
Electron loss and collisional destruction of fast $\text{He}^+(2S)$ ions and application to a polarized ${}^3\text{He}$ ion source
47. Simpson F.R. and Gilbody H.B.
J. Phys. B5, 1959 (1972)
Electron detachment in collisions involving 4-30 keV He^- and H^- ions
48. Smith F.T., Fleishmann H.H. and Young R.A.
Phys. Rev. A2, 379 (1970)
Collision spectroscopy. III. Scattering in low-energy charge-transfer collisions of He^+ and Ar
49. Stedeford J.B.H. and Hasted J.B.
Proc. Roy. Soc.(London) A227, 466 (1955)
Further investigations of charge exchange and electron detachment
50. Wittkower A.B., Levy G. and Gilbody H.B.
Proc. Phys. Soc. 90, 581 (1967)
Metastable atoms in fast helium beams
51. Wittkower A.B., Levy G. and Gilbody H.B. (a)
Proc. Phys. Soc. 91, 862 (1967)
Charge-changing collisions involving fast helium beams--the effect of a metastable atom component

2.3 Lists of Experimental Data for σ_{0-1} , σ_{10} , σ_{1-1} , σ_{21} , σ_{20} , σ_{-10} ,
 σ_{1-1} , σ_{01} , σ_{02} and σ_{12}

Note on Table

Meth. : Experimental method*

- A : Attenuation method
- C : Condenser method
- Coi : Coincidence method
- D : From differential
- E : Equilibrium method
- G : Growth method
- M : Mass spectrometric method
- O : Others

F/T

- F : Data from figures read by using program READXY**,**
- T : Data from tables

* For the detailed discussions on the experimental method, see the Appendix of ref. (3) of Introduction.

** READXY was prepared by T. Nakagawa, Nuclear Data Center.

*** Numerical values are read from figures of references by us under our responsibility.

Table 2.3.1 List of Experimental Data for σ_{0-1}

Authors	Year	Energy Range(eV)	Target	Meth.	F/T	Ref.
Fogel' et al.	1960	1.00+4 ~ 6.00+4	Ne,Ar,Kr,Xe	C	F	14

Table 2.3.2 List of Experimental Data for σ_{10}

Authors	Year	Energy Range(eV)	Target	Meth.	F/T	Ref.
Dillon et al.	1955	5.00+1 ~ 7.20+2	He	M	F	11
Stedeford & Hasted	1955	1.00+2 ~ 4.00+4	He,Ne,Ar,Kr,Xe	C	F	49
Allison et al.	1956	1.00+5 ~ 4.50+5	He	G	T	3
Fedorenko et al.	1956	1.58+3 ~ 1.77+5	He,Ne,Ar,Kr	C	F	13
Cramer & Simons	1957	4.00+0 ~ 4.00+2	He	G	T	9
Barnett & Stier	1958	8.00+3 ~ 2.00+5	He,Ne,Ar	G+E	F	4
Jones et al.	1959	2.50+4 ~ 1.00+5	He,Ne,Ar	G+D	T	25
Nikolaev et al.	1961	3.20+5 ~ 1.32+6	He,Ar,Kr	G	F	34
Pivovarov et al.	1962	2.00+5 ~ 1.50+6	He,Ar,Kr	G+M	F	40
Hayden & Utterback	1964	4.70+1 ~ 1.00+3	He	C	F	19
de Heer et al.	1966	1.00+4 ~ 1.40+5	He,Ne,Ar,Kr	C	T	10
Koopman	1967	9.50+1 ~ 9.40+2	Ar,Kr,Xe	C	F	26
Wittkower et al. (a)	1967	7.40+4 ~ 3.00+5	He	G	F	51
Belyaev et al.	1968	7.00+0 ~ 1.00+2	He	M	F	7
Mahadevan & Magnuson	1968	1.00+0 ~ 1.90+2	He,Ar	C	F	29
Nagy et al.	1969	4.00+2 ~ 2.00+3	He	A	T	32
Schlumbohm	1969	2.00+1 ~ 2.00+2	Ar,Kr	C	F	43
Smith et al.	1970	5.00+1 ~ 3.00+2	Ar	G+D	T	48
Gilbody et al.	1971	1.00+4 ~ 2.00+4	He,Ne,Ar,Kr	A	F	18
Shelton & Stoycheff	1971	2.00+3 ~ 2.20+4	He	C	T	44
Moran & Conrads	1973	1.00+3 ~ 3.00+3	Ar	G	T	31
Latypov & Shaporenko	1975	1.50+2 ~ 3.20+3	He	C+M	F	28
Eisele & Nagy	1976	7.00+2 ~ 5.00+3	He	C	T	15
Eisele & Nagy	1977	8.00+2 ~ 5.20+3	Ne,Ar	C	T	16
Helm	1977	3.00-1 ~ 8.00+0	He	O	T	22

Table 2.3.3 List of Experimental Data for σ_{1-1}

Authors	Year	Energy Range(eV)	Target	Meth.	F/T	Ref.
Melchior & Papkow	1964	2.00+4 ~ 7.00+4	Ne,Ar,Kr,Xe	G	F	30

Table 2.3.4 List of Experimental Data for σ_{21}

Authors	Year	Energy Range(eV)	Target	Meth.	F/T	Ref.
Allison	1958	1.50+5 ~ 4.50+5	He	G	T	2
Nikolaev et al.	1961	3.20+5 ~ 2.88+6	He,Ar,Kr	G	F	34
Pivovar et al.	1962	2.00+5 ~ 1.50+6	He,Ar,Kr	G+M	F	40
Pivovar et al. (a)	1962	3.00+5 ~ 1.50+6	He,Ar,Kr	G+M	F	41
Berkner et al.	1968	9.60+3 ~ 2.41+5	He	G	T	8
Baragiola & Nemirovsky	1973	5.07+4 ~ 4.00+5	Ne,Ar	G	F	5
Shah & Gilbody	1974	1.33+4 ~ 7.33+4	He,Ar,Kr	G	F	45
Afrosimov et al.	1975	1.20+4 ~ 1.00+5	He	Coi	F	1
Bayfield & Khayrallah	1975	1.20+4 ~ 1.26+5	He,Ar	G	F	6
Hvelplund et al.	1976	1.00+6 ~ 7.60+6	He,Ar	G	F	24

Table 2.3.5 List of Experimental Data for σ_{20}

Authors	Year	Energy Range(eV)	Target	Meth.	F/T	Ref.
Allison	1958	1.50+5 ~ 4.50+5	He	G	T	2
Nikolaev et al.	1962	3.24+5 ~ 1.32+6	He,Ar,Kr	G	F	35
Pivovar et al. (a)	1962	3.00+5 ~ 1.50+6	He,Ar,Kr	G+M	F	41
Berkner et al.	1968	9.60+3 ~ 2.41+5	He	G	T	8
Baragiola & Nemirovsky	1973	5.07+4 ~ 3.53+5	Ne,Ar	G	F	5
Shah & Gilbody	1974	1.33+4 ~ 7.33+4	He,Ar,Kr	G	F	45
Afrosimov et al.	1975	1.50+3 ~ 1.00+5	He	Coi	F	1
Bayfield & Khayrallah	1975	1.15+4 ~ 1.26+5	He,Ar	G	F	6

Table 2.3.6 List of Experimental Data for σ_{-10}

Authors	Year	Energy Range(eV)	Target	Meth.	F/T	Ref.
Nicholas et al.	1968	2.77+4 ~ 6.50+4	He	G	F	33
Ryding et al.	1968	4.00+5 ~ 1.50+6	He,Ne	G	T	42
Simpson & Gilbody	1972	4.00+3 ~ 3.00+4	He,Ar	G	F	47
Heinemeier et al.	1975	1.00+5 ~ 3.00+6	He,Ar	G	F	20
Heinemeier et al.	1976	1.00+5 ~ 3.00+6	He,Ne,Ar	G	T	21

Table 2.3.7 List of Experimental Data for σ_{-11}

Authors	Year	Energy Range(eV)	Target	Meth.	F/T	Ref.
Ryding et al.	1968	4.00+5 ~ 1.50+6	He,Ne	G	T	42
Heinemeier et al.	1975	1.50+5 ~ 3.00+6	He,Ar	G	F	20
Heinemeier et al.	1976	1.00+5 ~ 3.00+6	He,Ne,Ar	G	T	21

Table 2.3.8 List of Experimental Data for σ_{01}

Authors	Year	Energy Range(eV)	Target	Meth.	F/T	Ref.
Kranser	1955	1.00+5 ~ 4.50+5	He	A	T	27
Allison	1958	1.50+5 ~ 4.50+5	He	G+E	T	2
Barnett & Stier	1958	4.00+3 ~ 2.00+5	He,Ne,Ar	G+E	F	4
Fogel' et al.	1960	1.00+4 ~ 6.00+4	He,Ne,Ar,Kr,Xe	C	F	14
Pivovar et al.	1962	2.00+5 ~ 1.00+6	He,Ar,Kr	G+M	F	40
Wittkower et al.	1967	1.20+5	He,Ne,Ar,Kr	G	T	50
Wittkower et al. (a)	1967	7.40+4 ~ 2.00+5	He	G	F	51
Gilbody et al.	1970	1.00+4 ~ 3.50+5	He,Ne,Ar,Kr	G	F	17
Hvelplund & Pedersen	1974	2.00+4 ~ 4.00+6	He,Ar,Kr	G	F	23
Pedersen & Hvelplund	1974	2.00+4 ~ 4.00+6	He	A+G	T	37
Noda	1976	2.00+2 ~ 5.00+3	He	G	F+T	36
Pedersen et al.	1977	1.00+5 ~ 4.00+6	Xe	G	F	38
Pedersen et al.	1980	2.50+4 ~ 3.60+6	He,Ne,Ar	G	T	39

Table 2.3.9 List of Experimental Data for σ_{02}

Authors	Year	Energy Range(eV)	Target	Meth.	F/T	Ref.
Hvelplund & Pedersen	1974	2.00+5 ~ 4.00+6	He,Ar,Kr	G	F	23

Table 2.3.10 List of Experimental Data for σ_{12}

Authors	Year	Energy Range(eV)	Target	Meth.	F/T	Ref.
Allison	1958	1.50+5 ~ 4.50+5	He	G	T	2
Jones et al.	1959	2.50+4 ~ 1.00+5	He,Ne,Ar	G+D	T	25
Dmitriev et al.	1962	3.20+5 ~ 6.00+6	He,Ar,Kr	G	F	12
Pivovar et al.	1962	2.00+5 ~ 1.50+6	He,Ar,Kr	G	F	40
Shah & Gilbody	1975	2.50+4 ~ 6.70+4	He,Ar	G	F	46

2.4 Graphs and Tables of Cross Sections

Note on Tables

E(EV)	Projectile Energy in eV
V(10(8)*CM/SEC)	Projectile Velocity in 10^8 cm/sec
SIGMA(CM(2))	Cross Section in cm^2

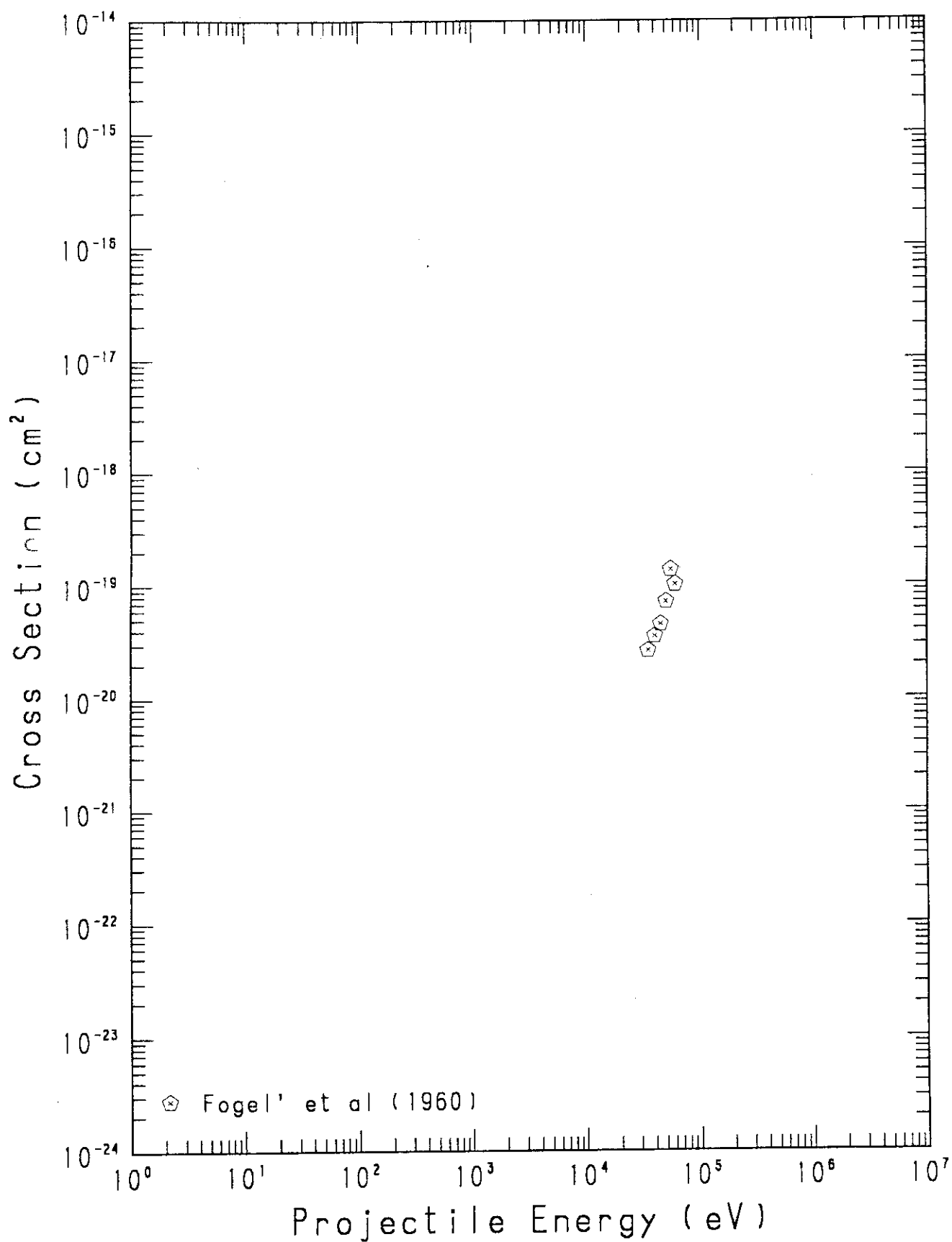
Fig. 1 He + Ne \rightarrow He⁻ (σ_{0-1})

TABLE 1

PROCESS : HE + NE = HE- (O-1)
FOGEL' ET AL, SOV. PHYS. JETP 11 18 (1960)

DATA FROM FIGURES

E(EV)	V(10(8)*CM/SEC)	SIGMA(CM(2))
3.50E+04	1.30E+00	2.63E-20
4.00E+04	1.39E+00	3.54E-20
4.50E+04	1.47E+00	4.51E-20
5.00E+04	1.55E+00	7.13E-20
5.50E+04	1.63E+00	1.36E-19
6.00E+04	1.70E+00	1.01E-19

Fig. 2 He + Ar → He⁻ (σ₀₋₁)

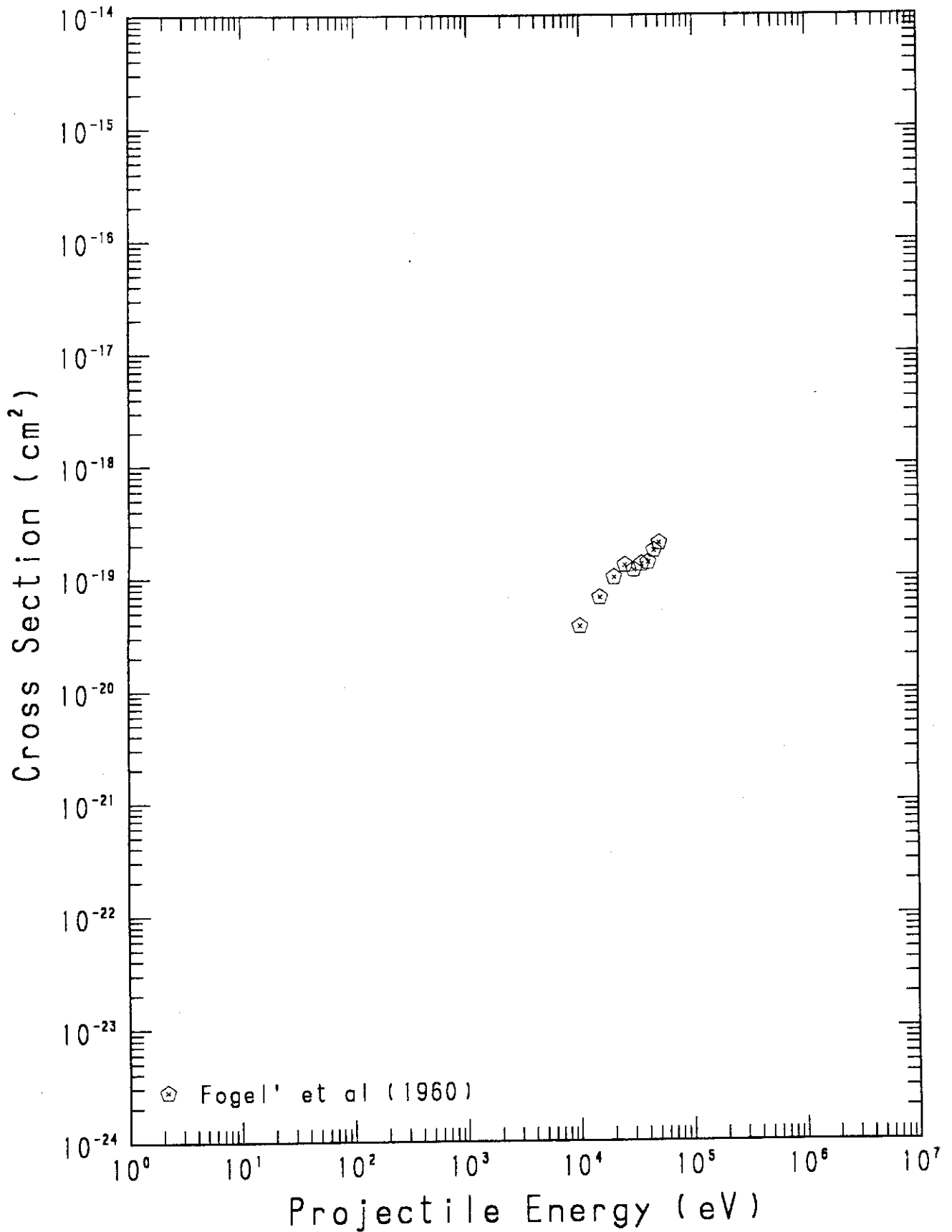


TABLE 2

PROCESS : HE + AR = HE⁻ (O-1)
FOGEL' ET AL, SOV. PHYS. JETP 11 18 (1960)

DATA FROM FIGURES

E(EV)	V(10(8)*CM/SEC)	SIGMA(CM(2))
1.00E+04	6.95E-01	3.66E-20
1.50E+04	8.51E-01	6.59E-20
2.00E+04	9.82E-01	9.92E-20
2.50E+04	1.10E+00	1.27E-19
3.00E+04	1.20E+00	1.15E-19
3.50E+04	1.30E+00	1.30E-19
4.00E+04	1.39E+00	1.34E-19
4.50E+04	1.47E+00	1.71E-19
5.00E+04	1.55E+00	2.00E-19

Fig. 3 He + Kr \rightarrow He⁻ (σ_{0-1})

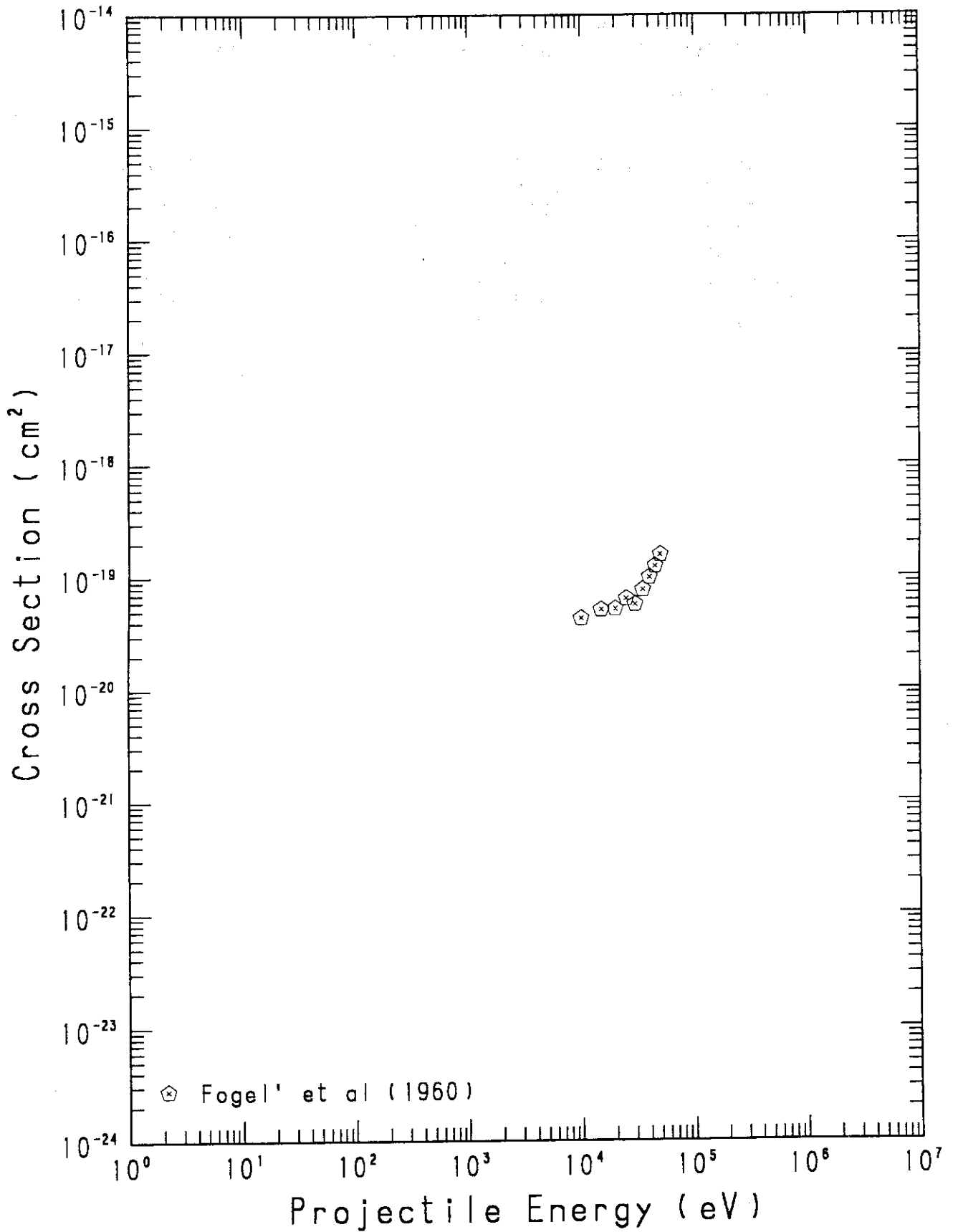


TABLE 3

PROCESS : HE + KR = HE- (0-1)
FOGEL' ET AL, SOV. PHYS. JETP 11 18 (1960)

DATA FROM FIGURES

E(EV)	V(10(8)*CM/SEC)	SIGMA(CM(2))
1.00E+04	6.95E-01	4.31E-20
1.50E+04	8.51E-01	5.13E-20
2.00E+04	9.82E-01	5.20E-20
2.50E+04	1.10E+00	6.42E-20
3.00E+04	1.20E+00	5.68E-20
3.50E+04	1.30E+00	7.70E-20
4.00E+04	1.39E+00	9.87E-20
4.50E+04	1.47E+00	1.24E-19
5.00E+04	1.55E+00	1.56E-19

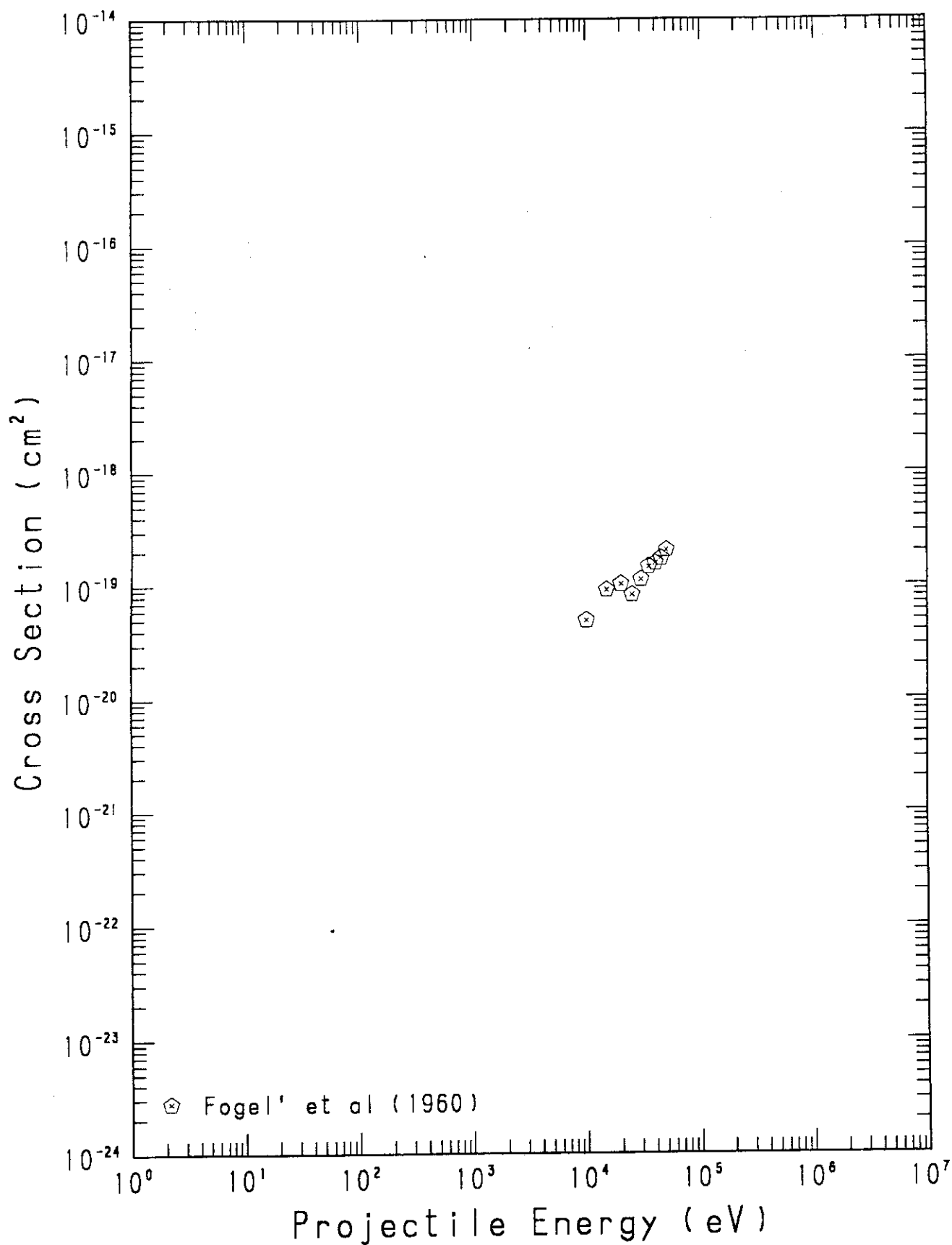
Fig. 4 He + Xe \rightarrow He⁻ (σ_{0-1})

TABLE 4

PROCESS : HE + XE = HE- (0-1)
FOGEL' ET AL, SOV. PHYS. JETP 11 18 (1960)

DATA FROM FIGURES

E(EV)	V(10(8)*CM/SEC)	SIGMA(CM(2))
1.00E+04	6.95E-01	4.91E-20
1.50E+04	8.51E-01	9.10E-20
2.00E+04	9.82E-01	1.02E-19
2.50E+04	1.10E+00	8.23E-20
3.00E+04	1.20E+00	1.12E-19
3.50E+04	1.30E+00	1.45E-19
4.00E+04	1.39E+00	1.55E-19
4.50E+04	1.47E+00	1.72E-19
5.00E+04	1.55E+00	2.03E-19

Fig. 5 $\text{He}^+ + \text{He} \rightarrow \text{He} \quad (\sigma_{10})$

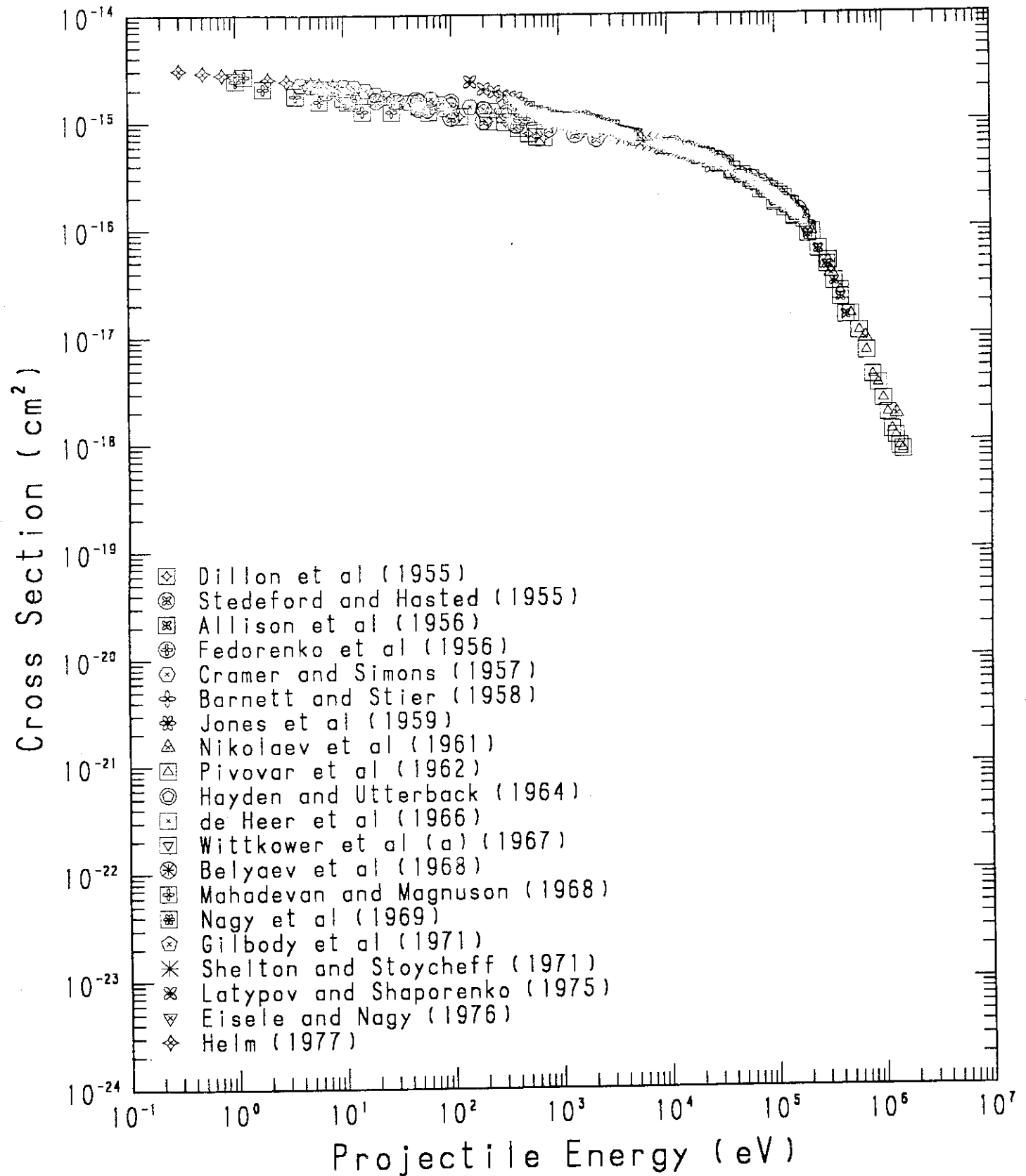


TABLE 5

PROCESS : HE+ + HE = HE (10)
 DILLON ET AL, J. CHEM. PHYS. 23 776 (1955)

DATA FROM FIGURES

E(EV)	V(10(8)*CM/SEC)	SIGMA(CM(2))
5.00E+01	4.91E-02	1.42E-15
1.20E+02	7.61E-02	1.13E-15
2.20E+02	1.03E-01	1.02E-15
3.20E+02	1.24E-01	9.95E-16
4.20E+02	1.42E-01	8.78E-16
5.20E+02	1.58E-01	7.82E-16
6.20E+02	1.73E-01	7.30E-16
7.20E+02	1.86E-01	7.13E-16

STEDFORD AND HASTED, PROC. ROY. SOC. A227 466 (1955)

DATA FROM FIGURES

E(EV)	V(10(8)*CM/SEC)	SIGMA(CM(2))
1.00E+02	6.95E-02	1.10E-15
2.00E+02	9.82E-02	1.02E-15
4.00E+02	1.39E-01	9.41E-16
8.00E+02	1.96E-01	8.61E-16
1.40E+03	2.60E-01	7.58E-16
2.20E+03	3.26E-01	6.96E-16
2.20E+03	3.26E-01	8.34E-16
5.00E+03	4.91E-01	7.01E-16
1.00E+04	6.95E-01	5.81E-16
1.50E+04	8.51E-01	5.34E-16
2.00E+04	9.82E-01	4.78E-16
2.50E+04	1.10E+00	4.58E-16
3.00E+04	1.20E+00	4.36E-16
3.50E+04	1.30E+00	3.94E-16

ALLISON ET AL, PHYS. REV. 102 1041 (1956)

DATA FROM TABLES

E(EV)	V(10(8)*CM/SEC)	SIGMA(CM(2))
1.00E+05	2.20E+00	1.69E-16
1.50E+05	2.69E+00	1.24E-16
2.00E+05	3.11E+00	8.60E-17
2.50E+05	3.47E+00	6.20E-17
3.00E+05	3.80E+00	4.40E-17
3.50E+05	4.11E+00	3.10E-17
4.00E+05	4.39E+00	2.20E-17
4.50E+05	4.66E+00	1.50E-17

TABLE 5 -CONTINUED

FEDORENKO ET AL, SOV. PHYS. TP 1 1861 (1956)

DATA FROM FIGURES

E(EV)	V(10(8)*CM/SEC)	SIGMA(CM(2))
1.15E+04	7.45E-01	6.06E-16
2.22E+04	1.03E+00	4.70E-16
3.35E+04	1.27E+00	3.91E-16
4.65E+04	1.50E+00	3.12E-16
6.00E+04	1.70E+00	2.91E-16
7.55E+04	1.91E+00	2.54E-16
9.00E+04	2.08E+00	2.30E-16
1.05E+05	2.25E+00	2.00E-16
1.20E+05	2.41E+00	1.75E-16
1.35E+05	2.55E+00	1.63E-16
1.48E+05	2.67E+00	1.41E-16
1.65E+05	2.82E+00	1.44E-16
1.75E+05	2.91E+00	1.28E-16

CRAMER AND SIMONS, J. CHEM. PHYS. 26 1272 (1957)

DATA FROM TABLES

E(EV)	V(10(8)*CM/SEC)	SIGMA(CM(2))
4.00E+00	1.39E-02	2.23E-15
5.00E+00	1.55E-02	2.19E-15
6.50E+00	1.77E-02	2.11E-15
8.00E+00	1.96E-02	2.10E-15
1.00E+01	2.20E-02	2.14E-15
1.25E+01	2.46E-02	2.12E-15
1.60E+01	2.78E-02	1.97E-15
2.00E+01	3.11E-02	1.83E-15
2.50E+01	3.47E-02	1.70E-15
3.20E+01	3.93E-02	1.56E-15
4.00E+01	4.39E-02	1.54E-15
5.00E+01	4.91E-02	1.58E-15
6.50E+01	5.60E-02	1.64E-15
8.00E+01	6.21E-02	1.49E-15
1.00E+02	6.95E-02	1.44E-15
1.50E+02	8.51E-02	1.39E-15
2.00E+02	9.82E-02	1.31E-15
2.50E+02	1.10E-01	1.28E-15
3.00E+02	1.20E-01	1.15E-15
4.00E+02	1.39E-01	1.11E-15

TABLE 5 -CONTINUED

BARNETT AND STIER, PHYS. REV. 109 385 (1958)

DATA FROM FIGURES

E(EV)	V(10(8)*CM/SEC)	SIGMA(CM(2))
8.00E+03	6.21E-01	5.77E-16
1.20E+04	7.61E-01	5.65E-16
1.60E+04	8.79E-01	5.48E-16
2.00E+04	9.82E-01	4.85E-16
2.40E+04	1.08E+00	4.78E-16
2.70E+04	1.14E+00	4.63E-16
2.90E+04	1.18E+00	4.27E-16
3.10E+04	1.22E+00	4.31E-16
4.00E+04	1.39E+00	3.57E-16
5.00E+04	1.55E+00	3.06E-16
6.00E+04	1.70E+00	2.78E-16
7.00E+04	1.84E+00	2.55E-16
8.00E+04	1.96E+00	2.35E-16
1.00E+05	2.20E+00	2.04E-16
1.20E+05	2.41E+00	1.76E-16
1.40E+05	2.60E+00	1.56E-16
1.60E+05	2.78E+00	1.37E-16
1.80E+05	2.95E+00	1.21E-16
2.00E+05	3.11E+00	1.07E-16

JONES ET AL, PHYS. REV. 113 182 (1959)

DATA FROM TABLES

E(EV)	V(10(8)*CM/SEC)	SIGMA(CM(2))
2.50E+04	1.10E+00	3.80E-16
5.00E+04	1.55E+00	3.00E-16
1.00E+05	2.20E+00	1.90E-16

NIKOLAEV ET AL, SOV. PHYS. JETP 13 695 (1961)

DATA FROM FIGURES

E(EV)	V(10(8)*CM/SEC)	SIGMA(CM(2))
3.28E+05	3.98E+00	3.67E-17
6.80E+05	5.73E+00	9.02E-18
1.32E+06	7.98E+00	1.75E-18

TABLE 5 -CONTINUED

PIVOVAR ET AL, SOV. PHYS. JETP 14 20 (1962)

DATA FROM FIGURES

E(EV)	V(10(8)*CM/SEC)	SIGMA(CM(2))
2.20E+05	3.26E+00	8.96E-17
3.10E+05	3.87E+00	4.78E-17
4.00E+05	4.39E+00	2.51E-17
5.00E+05	4.91E+00	1.52E-17
6.00E+05	5.38E+00	1.06E-17
7.00E+05	5.81E+00	6.94E-18
8.00E+05	6.21E+00	4.13E-18
9.00E+05	6.59E+00	3.42E-18
1.00E+06	6.95E+00	2.46E-18
1.10E+06	7.28E+00	1.80E-18
1.20E+06	7.61E+00	1.25E-18
1.30E+06	7.92E+00	1.09E-18
1.40E+06	8.22E+00	8.71E-19
1.50E+06	8.51E+00	8.17E-19

HAYDEN AND UTTERBACK, PHYS. REV. 135 A1575 (1964)

DATA FROM FIGURES

E(EV)	V(10(8)*CM/SEC)	SIGMA(CM(2))
4.70E+01	4.76E-02	1.61E-15
1.00E+02	6.95E-02	1.54E-15
2.00E+02	9.82E-02	1.31E-15
3.30E+02	1.26E-01	1.22E-15
5.00E+02	1.55E-01	1.14E-15
7.00E+02	1.84E-01	1.08E-15
1.00E+03	2.20E-01	1.05E-15

DE HEER ET AL, PHYSICA 32 1793 (1966)

DATA FROM TABLES

E(EV)	V(10(8)*CM/SEC)	SIGMA(CM(2))
1.00E+04	6.95E-01	5.83E-16
1.50E+04	8.51E-01	5.29E-16
2.00E+04	9.82E-01	4.70E-16
2.50E+04	1.10E+00	4.32E-16
3.00E+04	1.20E+00	4.00E-16
3.50E+04	1.30E+00	3.94E-16
4.00E+04	1.39E+00	3.44E-16
5.00E+04	1.55E+00	3.09E-16
6.00E+04	1.70E+00	2.83E-16
7.00E+04	1.84E+00	2.61E-16

TABLE 5 -CONTINUED

8.00E+04	1.96E+00	2.37E-16
9.00E+04	2.08E+00	2.24E-16
1.00E+05	2.20E+00	2.10E-16
1.10E+05	2.30E+00	1.97E-16
1.20E+05	2.41E+00	1.86E-16
1.30E+05	2.50E+00	1.63E-16
1.40E+05	2.60E+00	1.59E-16

WITTKOWER ET AL (A), PROC. PHYS. SOC. 91 862 (1967)

DATA FROM FIGURES

E(EV)	V(10(8)*CM/SEC)	SIGMA(CM(2))
7.40E+04	1.89E+00	2.23E-16
1.00E+05	2.20E+00	1.75E-16
1.25E+05	2.46E+00	1.48E-16
1.50E+05	2.69E+00	1.27E-16
2.00E+05	3.11E+00	8.67E-17
2.50E+05	3.47E+00	6.23E-17
3.00E+05	3.80E+00	4.46E-17

BELYAEV ET AL, SOV. PHYS. -JETP 27 924 (1968)

DATA FROM FIGURES

E(EV)	V(10(8)*CM/SEC)	SIGMA(CM(2))
7.00E+00	1.84E-02	1.94E-15
1.00E+01	2.20E-02	1.85E-15
2.00E+01	3.11E-02	1.59E-15
3.00E+01	3.80E-02	1.58E-15
5.00E+01	4.91E-02	1.34E-15
6.00E+01	5.38E-02	1.32E-15
8.40E+01	6.37E-02	1.35E-15
1.00E+02	6.95E-02	1.28E-15

MAHADEVAN AND MAGNUSON, PHYS. REV. 171 (1968)

DATA FROM FIGURES

E(EV)	V(10(8)*CM/SEC)	SIGMA(CM(2))
1.00E+00	6.95E-03	2.45E-15
1.20E+00	7.61E-03	2.70E-15
1.80E+00	9.32E-03	2.06E-15
3.60E+00	1.32E-02	1.76E-15
6.00E+00	1.70E-02	1.57E-15

TABLE 5 -CONTINUED

1.00E+01	2.20E-02	1.70E-15
1.10E+01	2.30E-02	1.55E-15
1.20E+01	2.41E-02	1.62E-15
1.50E+01	2.69E-02	1.26E-15
2.80E+01	3.68E-02	1.25E-15
6.20E+01	5.47E-02	1.24E-15

NAGY ET AL, PHYS. REV. 177 71 (1969)

DATA FROM TABLES

E(EV)	V(10(8)*CM/SEC)	SIGMA(CM(2))
4.00E+02	1.39E-01	1.42E-15
5.00E+02	1.55E-01	1.30E-15
6.00E+02	1.70E-01	1.18E-15
7.00E+02	1.84E-01	1.13E-15
8.00E+02	1.96E-01	1.08E-15
9.00E+02	2.08E-01	1.05E-15
1.00E+03	2.20E-01	1.04E-15
1.10E+03	2.30E-01	1.03E-15
1.20E+03	2.41E-01	1.01E-15
1.30E+03	2.50E-01	1.00E-15
1.40E+03	2.60E-01	9.78E-16
1.50E+03	2.69E-01	9.68E-16
1.60E+03	2.78E-01	9.71E-16
1.70E+03	2.86E-01	9.09E-16
1.80E+03	2.95E-01	9.29E-16
1.90E+03	3.03E-01	9.00E-16
2.00E+03	3.11E-01	9.29E-16

GILBODY ET AL, J. PHYS. B4 800 (1971)

DATA FROM FIGURES

E(EV)	V(10(8)*CM/SEC)	SIGMA(CM(2))
3.00E+04	1.20E+00	3.80E-16
4.00E+04	1.39E+00	3.20E-16
6.00E+04	1.70E+00	2.58E-16
8.00E+04	1.96E+00	2.12E-16
1.00E+05	2.20E+00	1.83E-16
1.25E+05	2.46E+00	1.54E-16
1.50E+05	2.69E+00	1.30E-16
1.75E+05	2.91E+00	1.12E-16
2.00E+05	3.11E+00	9.90E-17

TABLE 5 -CONTINUED

SHELTON AND STOYCHEFF, PHYS. REV. A3 613 (1971)

DATA FROM TABLES

E(EV)	V(10(8)*CM/SEC)	SIGMA(CM(2))
2.00E+03	3.11E-01	8.46E-16
3.00E+03	3.80E-01	7.78E-16
4.00E+03	4.39E-01	7.29E-16
5.00E+03	4.91E-01	6.94E-16
6.00E+03	5.38E-01	6.58E-16
7.00E+03	5.81E-01	6.33E-16
8.00E+03	6.21E-01	6.13E-16
9.00E+03	6.59E-01	5.96E-16
1.00E+04	6.95E-01	5.81E-16
1.10E+04	7.28E-01	5.69E-16
1.20E+04	7.61E-01	5.56E-16
1.30E+04	7.92E-01	5.45E-16
1.40E+04	8.22E-01	5.36E-16
1.50E+04	8.51E-01	5.26E-16
1.60E+04	8.79E-01	5.15E-16
1.70E+04	9.06E-01	5.05E-16
1.80E+04	9.32E-01	4.97E-16
1.90E+04	9.57E-01	4.89E-16
2.00E+04	9.82E-01	4.81E-16
2.10E+04	1.01E+00	4.74E-16
2.20E+04	1.03E+00	4.63E-16

LATYPOV AND SHAPORENKO, SOV. PHYS. TP 19 976 (1975)

DATA FROM FIGURES

E(EV)	V(10(8)*CM/SEC)	SIGMA(CM(2))
1.50E+02	8.51E-02	2.38E-15
2.00E+02	9.82E-02	2.04E-15
2.50E+02	1.10E-01	1.92E-15
3.00E+02	1.20E-01	1.75E-15
3.50E+02	1.30E-01	1.70E-15
4.00E+02	1.39E-01	1.67E-15
4.50E+02	1.47E-01	1.46E-15
5.00E+02	1.55E-01	1.32E-15
6.00E+02	1.70E-01	1.22E-15
7.00E+02	1.84E-01	1.21E-15
8.00E+02	1.96E-01	1.10E-15
9.00E+02	2.08E-01	1.07E-15
1.00E+03	2.20E-01	1.03E-15
1.05E+03	2.25E-01	1.01E-15
1.10E+03	2.30E-01	1.02E-15
1.15E+03	2.36E-01	1.03E-15
1.20E+03	2.41E-01	1.05E-15
1.25E+03	2.46E-01	1.06E-15

TABLE 5 -CONTINUED

1.30E+03	2.50E-01	1.06E-15
1.40E+03	2.60E-01	1.06E-15
1.50E+03	2.69E-01	1.09E-15
1.60E+03	2.78E-01	1.11E-15
1.70E+03	2.86E-01	1.09E-15
1.80E+03	2.95E-01	1.04E-15
1.90E+03	3.03E-01	1.03E-15
2.00E+03	3.11E-01	1.02E-15
2.10E+03	3.18E-01	1.01E-15
2.20E+03	3.26E-01	9.98E-16
2.40E+03	3.40E-01	9.40E-16
2.60E+03	3.54E-01	9.35E-16
2.80E+03	3.68E-01	9.11E-16
3.00E+03	3.80E-01	9.01E-16
3.20E+03	3.93E-01	8.96E-16

EISELE AND NAGY, J. CHEM. PHYS. 65 752 (1976)

DATA FROM TABLES

E(EV)	V(10(8)*CM/SEC)	SIGMA(CM(2))
7.00E+02	1.84E-01	1.20E-15
8.00E+02	1.96E-01	1.08E-15
9.00E+02	2.08E-01	1.08E-15
1.00E+03	2.20E-01	1.08E-15
1.20E+03	2.41E-01	1.03E-15
1.40E+03	2.60E-01	9.97E-16
1.60E+03	2.78E-01	9.97E-16
1.80E+03	2.95E-01	9.48E-16
2.20E+03	3.26E-01	9.15E-16
2.40E+03	3.40E-01	9.01E-16
2.60E+03	3.54E-01	8.87E-16
2.80E+03	3.68E-01	8.70E-16
3.00E+03	3.80E-01	8.61E-16
3.20E+03	3.93E-01	8.51E-16
3.40E+03	4.05E-01	8.33E-16
3.60E+03	4.17E-01	8.23E-16
3.80E+03	4.28E-01	8.16E-16
4.00E+03	4.39E-01	8.07E-16
4.20E+03	4.50E-01	7.98E-16
4.40E+03	4.61E-01	7.91E-16
4.60E+03	4.71E-01	7.87E-16
4.80E+03	4.81E-01	7.81E-16
5.00E+03	4.91E-01	7.74E-16

TABLE 5 -CONTINUED

HELM, J. PHYS. B10 3683 (1977)

DATA FROM TABLES

E(EV)	V(10(8)*CM/SEC)	SIGMA(CM(2))
3.00E-01	3.80E-03	3.08E-15
5.00E-01	4.91E-03	2.92E-15
7.50E-01	6.01E-03	2.80E-15
1.00E+00	6.95E-03	2.71E-15
2.00E+00	9.82E-03	2.52E-15
3.00E+00	1.20E-02	2.41E-15
5.00E+00	1.55E-02	2.28E-15
6.00E+00	1.70E-02	2.24E-15
8.00E+00	1.96E-02	2.17E-15

Fig. 6 $\text{He}^+ + \text{Ne} \rightarrow \text{He} \ (\sigma_{10})$

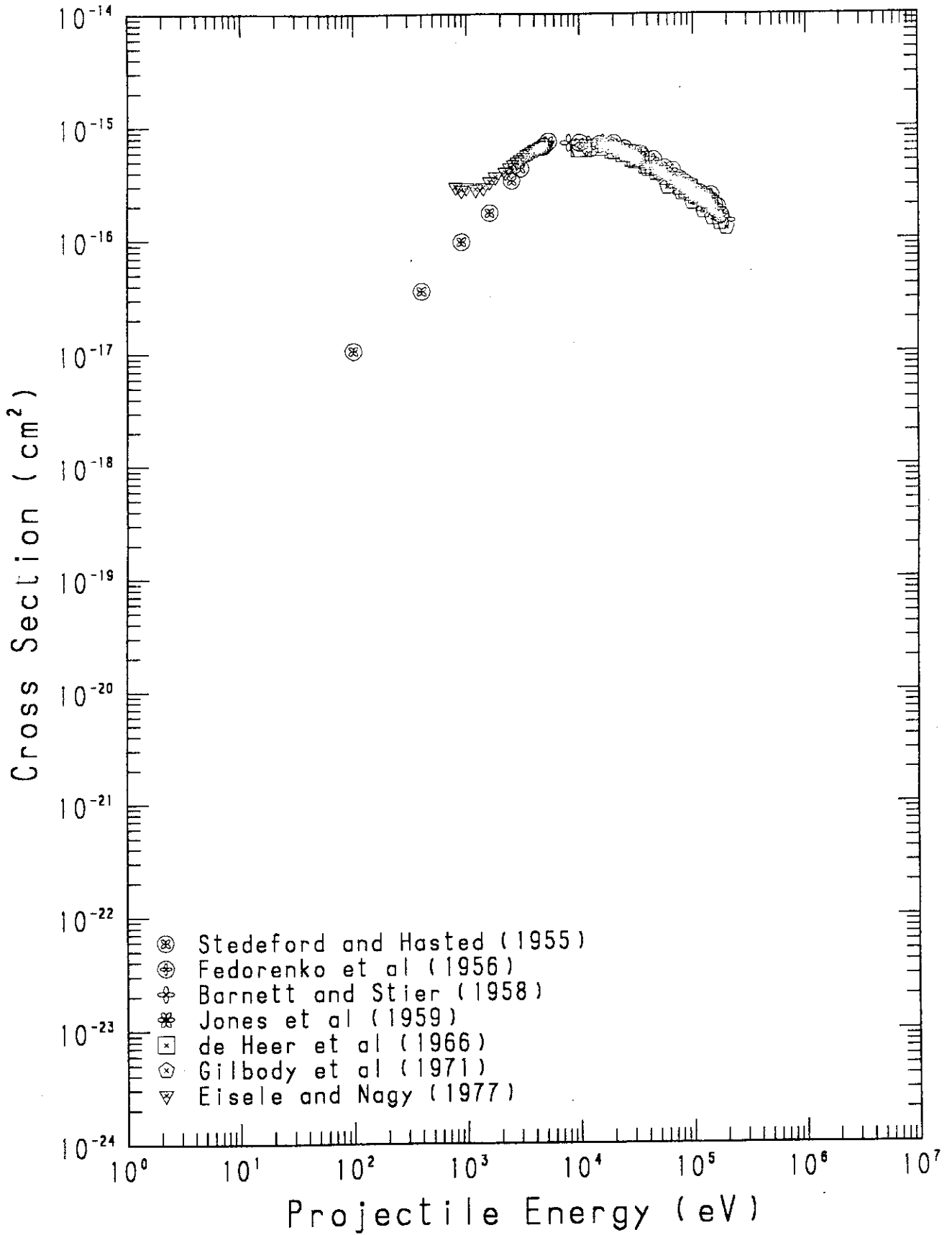


TABLE 6

PROCESS : HE+ + NE = HE (10)
 STEDEFORD AND HASTED, PROC. ROY. SOC. A227 466 (1955)

DATA FROM FIGURES

E(EV)	V(10(8)*CM/SEC)	SIGMA(CM(2))
1.00E+02	6.95E-02	1.05E-17
4.00E+02	1.39E-01	3.53E-17
9.00E+02	2.08E-01	9.64E-17
1.60E+03	2.78E-01	1.74E-16
2.50E+03	3.47E-01	3.36E-16
3.00E+03	3.80E-01	4.32E-16
4.80E+03	4.81E-01	6.73E-16
5.30E+03	5.06E-01	7.46E-16
1.00E+04	6.95E-01	7.24E-16
1.50E+04	8.51E-01	7.01E-16
2.00E+04	9.82E-01	7.12E-16
2.50E+04	1.10E+00	6.41E-16
3.00E+04	1.20E+00	5.81E-16
3.50E+04	1.30E+00	5.51E-16

FEDORENKO ET AL, SOV. PHYS. TP 1 1861 (1956)

DATA FROM FIGURES

E(EV)	V(10(8)*CM/SEC)	SIGMA(CM(2))
1.25E+04	7.77E-01	6.48E-16
1.86E+04	9.47E-01	6.81E-16
2.50E+04	1.10E+00	6.35E-16
3.45E+04	1.29E+00	5.73E-16
4.50E+04	1.47E+00	5.11E-16
5.60E+04	1.64E+00	4.31E-16
6.60E+04	1.78E+00	4.11E-16
7.65E+04	1.92E+00	3.43E-16
8.50E+04	2.02E+00	3.16E-16
9.50E+04	2.14E+00	2.96E-16
1.05E+05	2.25E+00	2.64E-16
1.15E+05	2.36E+00	2.57E-16
1.25E+05	2.46E+00	2.37E-16
1.35E+05	2.55E+00	2.29E-16
1.45E+05	2.64E+00	2.46E-16
1.55E+05	2.73E+00	2.02E-16
1.65E+05	2.82E+00	1.94E-16
1.77E+05	2.92E+00	1.62E-16

TABLE 6 -CONTINUED

BARNETT AND STIER, PHYS. REV. 109 385 (1958)

DATA FROM FIGURES

E(EV)	V(10(8)*CM/SEC)	SIGMA(CM(2))
8.00E+03	6.21E-01	7.24E-16
1.20E+04	7.61E-01	6.96E-16
1.60E+04	8.79E-01	7.21E-16
2.00E+04	9.82E-01	6.43E-16
2.40E+04	1.08E+00	6.18E-16
2.70E+04	1.14E+00	5.69E-16
2.90E+04	1.18E+00	5.07E-16
3.10E+04	1.22E+00	5.42E-16
4.00E+04	1.39E+00	4.31E-16
5.00E+04	1.55E+00	3.85E-16
6.00E+04	1.70E+00	3.43E-16
7.00E+04	1.84E+00	3.17E-16
8.00E+04	1.96E+00	2.90E-16
1.00E+05	2.20E+00	2.40E-16
1.20E+05	2.41E+00	2.13E-16
1.40E+05	2.60E+00	1.93E-16
1.60E+05	2.78E+00	1.71E-16
1.80E+05	2.95E+00	1.58E-16
2.00E+05	3.11E+00	1.46E-16

JONES ET AL, PHYS. REV. 113 182 (1959)

DATA FROM TABLES

E(EV)	V(10(8)*CM/SEC)	SIGMA(CM(2))
2.50E+04	1.10E+00	5.80E-16
5.00E+04	1.55E+00	4.00E-16
1.00E+05	2.20E+00	2.90E-16

DE HEER ET AL, PHYSICA 32 1793 (1966)

DATA FROM TABLES

E(EV)	V(10(8)*CM/SEC)	SIGMA(CM(2))
1.00E+04	6.95E-01	6.50E-16
1.50E+04	8.51E-01	6.60E-16
2.00E+04	9.82E-01	6.25E-16
2.50E+04	1.10E+00	5.81E-16
3.00E+04	1.20E+00	5.28E-16
3.50E+04	1.30E+00	5.08E-16
4.00E+04	1.39E+00	4.55E-16
5.00E+04	1.55E+00	4.00E-16
6.00E+04	1.70E+00	3.59E-16

TABLE 6 -CONTINUED

7.00E+04	1.84E+00	3.31E-16
8.00E+04	1.96E+00	2.93E-16
9.00E+04	2.08E+00	2.74E-16
1.00E+05	2.20E+00	2.59E-16
1.10E+05	2.30E+00	2.45E-16
1.20E+05	2.41E+00	2.35E-16
1.30E+05	2.50E+00	2.10E-16
1.40E+05	2.60E+00	2.02E-16

GILBODY ET AL, J. PHYS. B4 800 (1971)

DATA FROM FIGURES

E(EV)	V(10(8)*CM/SEC)	SIGMA(CM(2))
1.00E+04	6.95E-01	6.29E-16
2.00E+04	9.82E-01	5.95E-16
3.00E+04	1.20E+00	4.93E-16
4.00E+04	1.39E+00	4.20E-16
6.00E+04	1.70E+00	2.92E-16
8.00E+04	1.96E+00	2.56E-16
1.00E+05	2.20E+00	2.12E-16
1.25E+05	2.46E+00	1.77E-16
1.50E+05	2.69E+00	1.53E-16
1.75E+05	2.91E+00	1.39E-16
2.00E+05	3.11E+00	1.26E-16

EISELE AND NAGY, J. CHEM. PHYS. 66 883 (1977)

DATA FROM TABLES

E(EV)	V(10(8)*CM/SEC)	SIGMA(CM(2))
8.00E+02	1.96E-01	2.98E-16
9.00E+02	2.08E-01	2.78E-16
1.00E+03	2.20E-01	2.95E-16
1.20E+03	2.41E-01	2.84E-16
1.40E+03	2.60E-01	2.93E-16
1.60E+03	2.78E-01	3.30E-16
1.80E+03	2.95E-01	3.64E-16
2.20E+03	3.26E-01	4.01E-16
2.40E+03	3.40E-01	4.37E-16
2.60E+03	3.54E-01	4.66E-16
2.80E+03	3.68E-01	4.94E-16
3.00E+03	3.80E-01	5.17E-16
3.20E+03	3.93E-01	5.41E-16
3.40E+03	4.05E-01	5.70E-16
3.60E+03	4.17E-01	5.86E-16
3.80E+03	4.28E-01	6.05E-16

TABLE 6 -CONTINUED

4.00E+03	4.39E-01	6.31E-16
4.20E+03	4.50E-01	6.41E-16
4.40E+03	4.61E-01	6.58E-16
4.60E+03	4.71E-01	6.68E-16
4.80E+03	4.81E-01	6.80E-16
5.00E+03	4.91E-01	6.88E-16
5.20E+03	5.01E-01	6.95E-16

Fig. 7 $\text{He}^+ + \text{Ar} \rightarrow \text{He}$ (σ_{10})

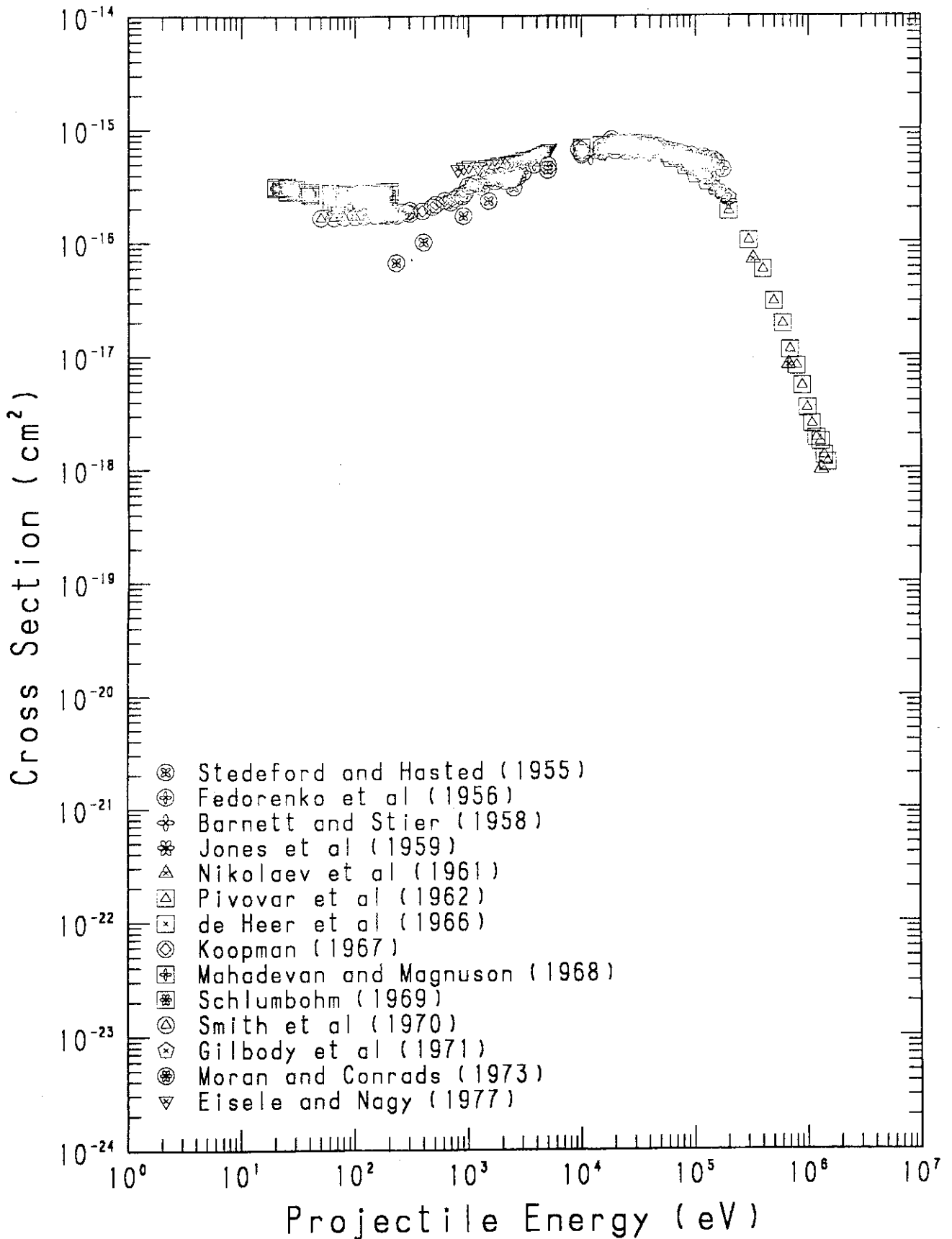


TABLE 7

PROCESS : HE+ + AR = HE (10)
 STEDEFORD AND HASTED, PROC. ROY. SOC. A227 466 (1955)

DATA FROM FIGURES

E(EV)	V(10(8)*CM/SEC)	SIGMA(CM(2))
2.30E+02	1.05E-01	6.67E-17
4.00E+02	1.39E-01	1.01E-16
9.00E+02	2.08E-01	1.72E-16
1.50E+03	2.69E-01	2.33E-16
2.50E+03	3.47E-01	3.06E-16
5.00E+03	4.91E-01	4.81E-16
5.00E+03	4.91E-01	4.39E-16
1.00E+04	6.95E-01	6.20E-16
1.00E+04	6.95E-01	5.97E-16
1.50E+04	8.51E-01	6.33E-16
1.50E+04	8.51E-01	7.01E-16
2.00E+04	9.82E-01	6.45E-16
2.00E+04	9.82E-01	7.02E-16
2.50E+04	1.10E+00	6.35E-16
2.50E+04	1.10E+00	7.06E-16
3.00E+04	1.20E+00	6.94E-16
3.00E+04	1.20E+00	6.52E-16
3.50E+04	1.30E+00	6.55E-16
3.50E+04	1.30E+00	7.23E-16
4.00E+04	1.39E+00	7.00E-16
4.00E+04	1.39E+00	6.69E-16

FEDORENKO ET AL, SOV. PHYS. TP 1 1861 (1956)

DATA FROM FIGURES

E(EV)	V(10(8)*CM/SEC)	SIGMA(CM(2))
3.78E+03	4.27E-01	4.87E-16
9.42E+03	6.74E-01	6.68E-16
1.83E+04	9.40E-01	8.09E-16
2.83E+04	1.17E+00	6.98E-16
4.80E+04	1.52E+00	7.00E-16
5.90E+04	1.69E+00	6.46E-16
6.70E+04	1.80E+00	6.32E-16
7.45E+04	1.90E+00	6.19E-16
8.05E+04	1.97E+00	5.99E-16
9.30E+04	2.12E+00	5.86E-16
1.04E+05	2.24E+00	5.17E-16
1.18E+05	2.39E+00	5.68E-16
1.31E+05	2.51E+00	5.42E-16
1.45E+05	2.64E+00	5.36E-16
1.55E+05	2.73E+00	5.10E-16
1.76E+05	2.91E+00	4.42E-16

TABLE 7 -CONTINUED

BARNETT AND STIER, PHYS. REV. 109 385 (1958)

DATA FROM FIGURES

E(EV)	V(10(8)*CM/SEC)	SIGMA(CM(2))
1.20E+04	7.61E-01	5.71E-16
1.60E+04	8.79E-01	6.27E-16
2.00E+04	9.82E-01	7.47E-16
2.40E+04	1.08E+00	7.43E-16
2.70E+04	1.14E+00	7.32E-16
2.90E+04	1.18E+00	6.37E-16
3.10E+04	1.22E+00	7.10E-16
4.00E+04	1.39E+00	6.09E-16
5.00E+04	1.55E+00	6.37E-16
6.00E+04	1.70E+00	6.03E-16
7.00E+04	1.84E+00	5.62E-16
8.00E+04	1.96E+00	5.32E-16
1.00E+05	2.20E+00	4.61E-16
1.20E+05	2.41E+00	3.89E-16
1.40E+05	2.60E+00	3.34E-16
1.60E+05	2.78E+00	2.89E-16
1.80E+05	2.95E+00	2.54E-16
2.00E+05	3.11E+00	2.28E-16

JONES ET AL, PHYS. REV. 113 182 (1959)

DATA FROM TABLES

E(EV)	V(10(8)*CM/SEC)	SIGMA(CM(2))
2.50E+04	1.10E+00	7.80E-16
5.00E+04	1.55E+00	6.40E-16
1.00E+05	2.20E+00	5.30E-16

NIKOLAEV ET AL, SOV. PHYS. JETP 13 695 (1961)

DATA FROM FIGURES

E(EV)	V(10(8)*CM/SEC)	SIGMA(CM(2))
3.28E+05	3.98E+00	7.01E-17
6.80E+05	5.73E+00	8.26E-18
1.32E+06	7.98E+00	9.73E-19

TABLE 7 -CONTINUED

PIVOVAR ET AL, SOV. PHYS. JETP 14 20 (1962)

DATA FROM FIGURES

E (EV)	V(10(8)*CM/SEC)	SIGMA(CM(2))
2.00E+05	3.11E+00	1.88E-16
3.00E+05	3.80E+00	1.03E-16
4.00E+05	4.39E+00	5.70E-17
5.00E+05	4.91E+00	2.98E-17
6.00E+05	5.38E+00	1.90E-17
7.00E+05	5.81E+00	1.12E-17
8.00E+05	6.21E+00	8.09E-18
9.00E+05	6.59E+00	5.41E-18
1.00E+06	6.95E+00	3.45E-18
1.10E+06	7.28E+00	2.49E-18
1.20E+06	7.61E+00	1.86E-18
1.30E+06	7.92E+00	1.72E-18
1.40E+06	8.22E+00	1.30E-18
1.50E+06	8.51E+00	1.13E-18

DE HEER ET AL, PHYSICA 32 1793 (1966)

DATA FROM TABLES

E (EV)	V(10(8)*CM/SEC)	SIGMA(CM(2))
1.00E+04	6.95E-01	6.88E-16
1.50E+04	8.51E-01	7.25E-16
2.00E+04	9.82E-01	7.51E-16
2.50E+04	1.10E+00	7.35E-16
3.00E+04	1.20E+00	7.52E-16
3.50E+04	1.30E+00	7.41E-16
4.00E+04	1.39E+00	7.13E-16
5.00E+04	1.55E+00	6.52E-16
6.00E+04	1.70E+00	6.00E-16
7.00E+04	1.84E+00	5.70E-16
8.00E+04	1.96E+00	5.41E-16
9.00E+04	2.08E+00	5.01E-16
1.00E+05	2.20E+00	4.69E-16
1.10E+05	2.30E+00	4.54E-16
1.20E+05	2.41E+00	4.26E-16
1.30E+05	2.50E+00	4.10E-16
1.40E+05	2.60E+00	4.00E-16

TABLE 7 -CONTINUED

KOOPMAN, PHYS. REV. 154 79 (1967)

DATA FROM FIGURES

E(EV)	V(10(8)*CM/SEC)	SIGMA(CM(2))
1.50E+02	8.51E-02	1.75E-16
1.70E+02	9.06E-02	1.75E-16
1.90E+02	9.57E-02	1.74E-16
2.20E+02	1.03E-01	1.81E-16
2.30E+02	1.05E-01	1.74E-16
2.60E+02	1.12E-01	1.89E-16
2.80E+02	1.16E-01	1.85E-16
3.00E+02	1.20E-01	1.81E-16
3.90E+02	1.37E-01	1.91E-16
4.80E+02	1.52E-01	2.07E-16
5.10E+02	1.57E-01	2.18E-16
6.10E+02	1.72E-01	2.36E-16
6.90E+02	1.82E-01	2.27E-16
7.60E+02	1.91E-01	2.45E-16
8.30E+02	2.00E-01	2.61E-16
8.80E+02	2.06E-01	2.57E-16
9.20E+02	2.11E-01	2.73E-16

MAHADEVAN AND MAGNUSON, PHYS. REV. 171 (1968)

DATA FROM FIGURES

E(EV)	V(10(8)*CM/SEC)	SIGMA(CM(2))
2.50E+01	3.47E-02	3.16E-16
4.00E+01	4.39E-02	2.73E-16
6.20E+01	5.47E-02	2.36E-16
6.80E+01	5.73E-02	1.88E-16
7.30E+01	5.93E-02	2.28E-16
8.00E+01	6.21E-02	2.35E-16
9.80E+01	6.88E-02	2.29E-16
1.35E+02	8.07E-02	2.07E-16
1.65E+02	8.92E-02	1.88E-16
1.90E+02	9.57E-02	2.22E-16

SCHLUMBOHM, Z.NATURFORSCH. 24A 1716 (1969)

DATA FROM FIGURES

E(EV)	V(10(8)*CM/SEC)	SIGMA(CM(2))
2.00E+01	3.11E-02	3.03E-16
2.00E+01	3.11E-02	3.14E-16
2.50E+01	3.47E-02	3.10E-16
2.50E+01	3.47E-02	2.85E-16
3.00E+01	3.80E-02	2.85E-16
3.00E+01	3.80E-02	3.03E-16
3.00E+01	3.80E-02	2.95E-16

TABLE 7 -CONTINUED

4.00E+01	4.39E-02	2.74E-16
4.00E+01	4.39E-02	2.84E-16
4.00E+01	4.39E-02	2.64E-16
6.00E+01	5.38E-02	2.63E-16
6.00E+01	5.38E-02	2.70E-16
6.00E+01	5.38E-02	2.77E-16
8.00E+01	6.21E-02	2.73E-16
8.00E+01	6.21E-02	2.64E-16
1.00E+02	6.95E-02	2.65E-16
1.00E+02	6.95E-02	2.74E-16
1.20E+02	7.61E-02	2.77E-16
1.20E+02	7.61E-02	2.69E-16
1.20E+02	7.61E-02	2.58E-16
1.40E+02	8.22E-02	2.74E-16
1.40E+02	8.22E-02	2.64E-16
1.40E+02	8.22E-02	2.55E-16
1.60E+02	8.79E-02	2.71E-16
1.60E+02	8.79E-02	2.62E-16
1.80E+02	9.32E-02	2.83E-16
1.80E+02	9.32E-02	2.73E-16
1.80E+02	9.32E-02	2.63E-16
2.00E+02	9.82E-02	2.87E-16
2.00E+02	9.82E-02	2.70E-16

SMITH ET AL, PHYS. REV. A2 379 (1970)

DATA FROM TABLES

E(EV)	V(10(8)*CM/SEC)	SIGMA(CM(2))
5.00E+01	4.91E-02	1.66E-16
6.50E+01	5.60E-02	1.67E-16
8.00E+01	6.21E-02	1.68E-16
1.00E+02	6.95E-02	1.70E-16
1.20E+02	7.61E-02	1.72E-16
1.40E+02	8.22E-02	1.74E-16
1.70E+02	9.06E-02	1.78E-16
2.00E+02	9.82E-02	1.82E-16
2.50E+02	1.10E-01	1.87E-16
3.00E+02	1.20E-01	1.93E-16

GILBODY ET AL, J. PHYS. B4 800 (1971)

DATA FROM FIGURES

E(EV)	V(10(8)*CM/SEC)	SIGMA(CM(2))
1.00E+04	6.95E-01	6.70E-16
2.00E+04	9.82E-01	7.20E-16

TABLE 7 -CONTINUED

3.00E+04	1.20E+00	7.12E-16
4.00E+04	1.39E+00	6.64E-16
6.00E+04	1.70E+00	5.28E-16
8.00E+04	1.96E+00	4.57E-16
1.00E+05	2.20E+00	3.86E-16
1.25E+05	2.46E+00	3.32E-16
1.50E+05	2.69E+00	3.00E-16
1.75E+05	2.91E+00	2.73E-16
2.00E+05	3.11E+00	2.45E-16

MORAN AND CONRADS, J. CHEM. PHYS. 58 3793 (1973)

DATA FROM TABLES

E(EV)	V(10(8)*CM/SEC)	SIGMA(CM(2))
1.00E+03	2.20E-01	3.20E-16
1.15E+03	2.36E-01	3.36E-16
1.30E+03	2.50E-01	3.10E-16
1.50E+03	2.69E-01	3.80E-16
1.70E+03	2.86E-01	3.47E-16
1.90E+03	3.03E-01	3.91E-16
2.10E+03	3.18E-01	3.50E-16
2.30E+03	3.33E-01	3.62E-16
2.50E+03	3.47E-01	3.67E-16
2.70E+03	3.61E-01	3.79E-16
3.00E+03	3.80E-01	4.15E-16

EISELE AND NAGY, J. CHEM. PHYS. 66 883 (1977)

DATA FROM TABLES

E(EV)	V(10(8)*CM/SEC)	SIGMA(CM(2))
8.00E+02	1.96E-01	4.47E-16
9.00E+02	2.08E-01	4.67E-16
1.00E+03	2.20E-01	4.83E-16
1.20E+03	2.41E-01	4.71E-16
1.40E+03	2.60E-01	4.88E-16
1.60E+03	2.78E-01	4.97E-16
1.80E+03	2.95E-01	5.16E-16
2.20E+03	3.26E-01	5.26E-16
2.40E+03	3.40E-01	5.36E-16
2.60E+03	3.54E-01	5.46E-16
2.80E+03	3.68E-01	5.48E-16
3.00E+03	3.80E-01	5.72E-16
3.20E+03	3.93E-01	5.74E-16
3.40E+03	4.05E-01	5.81E-16
3.60E+03	4.17E-01	5.85E-16

TABLE 7 -CONTINUED

3.80E+03	4.28E-01	5.94E-16
4.00E+03	4.39E-01	6.06E-16
4.20E+03	4.50E-01	6.19E-16
4.40E+03	4.61E-01	6.31E-16
4.60E+03	4.71E-01	6.48E-16
4.80E+03	4.81E-01	6.52E-16
5.00E+03	4.91E-01	6.70E-16
5.20E+03	5.01E-01	6.75E-16

Fig. 8 $\text{He}^+ + \text{Kr} \rightarrow \text{He} \quad (\sigma_{10})$

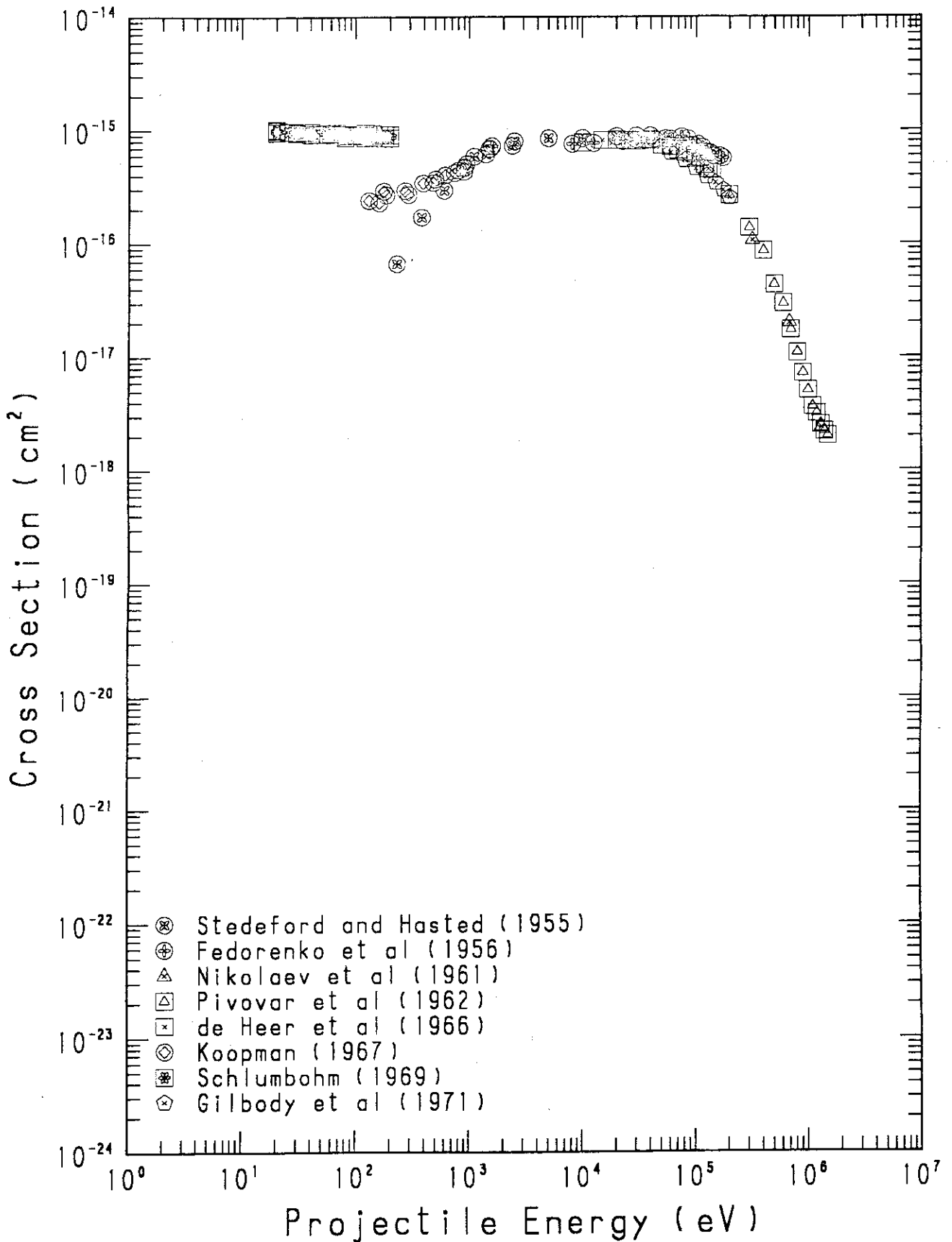


TABLE 8

PROCESS : HE+ + KR = HE (10)
 STEDEFORD AND HASTED, PROC. ROY. SOC. A227 466 (1955)

DATA FROM FIGURES

E(EV)	V(10(8)*CM/SEC)	SIGMA(CM(2))
2.30E+02	1.05E-01	6.67E-17
3.80E+02	1.35E-01	1.71E-16
6.00E+02	1.70E-01	2.96E-16
9.00E+02	2.08E-01	4.34E-16
1.10E+03	2.30E-01	5.89E-16
1.40E+03	2.60E-01	6.16E-16
1.50E+03	2.69E-01	6.87E-16
2.40E+03	3.40E-01	7.31E-16
2.50E+03	3.47E-01	7.99E-16
5.00E+03	4.91E-01	8.50E-16
1.00E+04	6.95E-01	8.50E-16
2.00E+04	9.82E-01	8.80E-16
3.00E+04	1.20E+00	8.90E-16
4.00E+04	1.39E+00	8.91E-16

FEDORENKO ET AL, SOV. PHYS. TP 1 1861 (1956)

DATA FROM FIGURES

E(EV)	V(10(8)*CM/SEC)	SIGMA(CM(2))
1.58E+03	2.76E-01	7.28E-16
8.10E+03	6.25E-01	7.57E-16
1.25E+04	7.77E-01	7.69E-16
2.28E+04	1.05E+00	7.93E-16
3.00E+04	1.20E+00	8.22E-16
3.40E+04	1.28E+00	8.34E-16
4.30E+04	1.44E+00	8.36E-16
5.43E+04	1.62E+00	8.43E-16
5.92E+04	1.69E+00	8.33E-16
7.50E+04	1.90E+00	8.69E-16
8.50E+04	2.02E+00	8.38E-16
9.50E+04	2.14E+00	7.34E-16
1.05E+05	2.25E+00	7.47E-16
1.15E+05	2.36E+00	7.05E-16
1.25E+05	2.46E+00	6.40E-16
1.35E+05	2.55E+00	6.30E-16
1.43E+05	2.63E+00	5.93E-16
1.64E+05	2.81E+00	5.91E-16
1.74E+05	2.90E+00	5.71E-16

TABLE 8 -CONTINUED

NIKOLAEV ET AL, SOV. PHYS. JETP 13 695 (1961)

DATA FROM FIGURES

E(EV)	V(10(8)*CM/SEC)	SIGMA(CM(2))
3.20E+05	3.93E+00	1.06E-16
6.80E+05	5.73E+00	1.99E-17
1.32E+06	7.98E+00	2.37E-18

PIVOVAR ET AL, SOV. PHYS. JETP 14 20 (1962)

DATA FROM FIGURES

E(EV)	V(10(8)*CM/SEC)	SIGMA(CM(2))
2.00E+05	3.11E+00	2.67E-16
3.00E+05	3.80E+00	1.37E-16
4.00E+05	4.39E+00	8.56E-17
5.00E+05	4.91E+00	4.33E-17
6.00E+05	5.38E+00	2.96E-17
7.00E+05	5.81E+00	1.74E-17
8.00E+05	6.21E+00	1.09E-17
9.00E+05	6.59E+00	7.21E-18
1.00E+06	6.95E+00	5.09E-18
1.10E+06	7.28E+00	3.64E-18
1.20E+06	7.61E+00	3.17E-18
1.30E+06	7.92E+00	2.53E-18
1.40E+06	8.22E+00	2.20E-18
1.50E+06	8.51E+00	2.01E-18

DE HEER ET AL, PHYSICA 32 1793 (1966)

DATA FROM TABLES

E(EV)	V(10(8)*CM/SEC)	SIGMA(CM(2))
1.00E+04	6.95E-01	7.75E-16
1.50E+04	8.51E-01	8.16E-16
2.00E+04	9.82E-01	8.18E-16
2.50E+04	1.10E+00	8.10E-16
3.00E+04	1.20E+00	8.07E-16
3.50E+04	1.30E+00	8.24E-16
4.00E+04	1.39E+00	8.16E-16
5.00E+04	1.55E+00	7.43E-16
6.00E+04	1.70E+00	7.20E-16
7.00E+04	1.84E+00	6.71E-16
8.00E+04	1.96E+00	6.43E-16
9.00E+04	2.08E+00	6.17E-16
1.00E+05	2.20E+00	5.61E-16
1.10E+05	2.30E+00	5.77E-16

TABLE 8 -CONTINUED

1.20E+05	2.41E+00	5.00E-16
1.30E+05	2.50E+00	4.56E-16
1.40E+05	2.60E+00	4.50E-16

KOOPTMAN, PHYS. REV. 154 79 (1967)

DATA FROM FIGURES

E(EV)	V(10(8)*CM/SEC)	SIGMA(CM(2))
1.30E+02	7.92E-02	2.41E-16
1.60E+02	8.79E-02	2.30E-16
1.75E+02	9.19E-02	2.92E-16
1.84E+02	9.42E-02	2.70E-16
2.70E+02	1.14E-01	2.94E-16
2.90E+02	1.18E-01	2.72E-16
3.90E+02	1.37E-01	3.44E-16
4.80E+02	1.52E-01	3.46E-16
5.00E+02	1.55E-01	3.73E-16
6.10E+02	1.72E-01	4.05E-16
7.40E+02	1.89E-01	4.24E-16
8.00E+02	1.96E-01	4.45E-16
9.00E+02	2.08E-01	4.72E-16
9.40E+02	2.13E-01	5.06E-16

SCHLUMBOHM, Z.NATURFORSCH. 24A 1716 (1969)

DATA FROM FIGURES

E(EV)	V(10(8)*CM/SEC)	SIGMA(CM(2))
2.00E+01	3.11E-02	1.01E-15
2.00E+01	3.11E-02	9.57E-16
2.00E+01	3.11E-02	9.89E-16
2.50E+01	3.47E-02	9.76E-16
3.00E+01	3.80E-02	9.68E-16
3.00E+01	3.80E-02	9.55E-16
3.00E+01	3.80E-02	9.37E-16
3.50E+01	4.11E-02	9.61E-16
4.00E+01	4.39E-02	9.66E-16
4.00E+01	4.39E-02	9.21E-16
4.50E+01	4.66E-02	9.31E-16
5.30E+01	5.06E-02	9.37E-16
6.00E+01	5.38E-02	9.43E-16
6.00E+01	5.38E-02	9.17E-16
6.70E+01	5.69E-02	9.45E-16
7.20E+01	5.89E-02	9.19E-16
8.00E+01	6.21E-02	8.67E-16
8.00E+01	6.21E-02	8.94E-16

TABLE 8 -CONTINUED

8.60E+01	6.44E-02	9.13E-16
9.40E+01	6.73E-02	9.15E-16
1.00E+02	6.95E-02	8.98E-16
1.00E+02	6.95E-02	9.25E-16
1.10E+02	7.28E-02	9.18E-16
1.20E+02	7.61E-02	9.47E-16
1.20E+02	7.61E-02	8.62E-16
1.20E+02	7.61E-02	9.03E-16
1.40E+02	8.22E-02	8.80E-16
1.40E+02	8.22E-02	9.43E-16
1.60E+02	8.79E-02	8.57E-16
1.60E+02	8.79E-02	9.16E-16
1.80E+02	9.32E-02	9.11E-16
1.80E+02	9.32E-02	8.57E-16
2.00E+02	9.82E-02	8.61E-16
2.00E+02	9.82E-02	9.11E-16

GILBODY ET AL, J. PHYS. B4 800 (1971)

DATA FROM FIGURES

E(EV)	V(10(8)*CM/SEC)	SIGMA(CM(2))
6.00E+04	1.70E+00	6.30E-16
8.00E+04	1.96E+00	5.43E-16
1.00E+05	2.20E+00	4.60E-16
1.25E+05	2.46E+00	3.90E-16
1.50E+05	2.69E+00	3.44E-16
1.75E+05	2.91E+00	2.96E-16
2.00E+05	3.11E+00	2.54E-16

Fig. 9 $\text{He}^+ + \text{Xe} \rightarrow \text{He} \quad (\sigma_{10})$

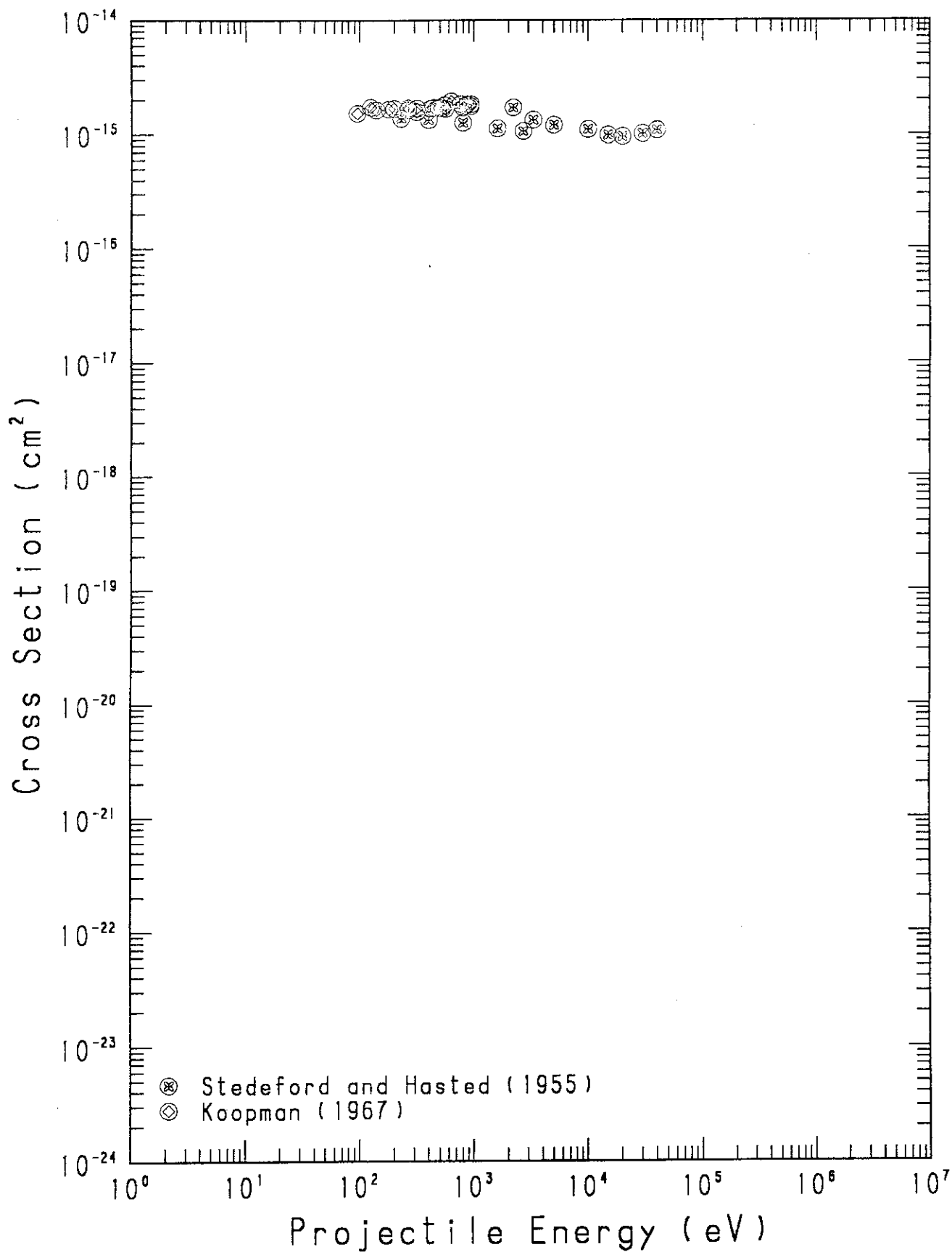


TABLE 9

PROCESS : HE+ + XE = HE (10)
 STEDEFORD AND HASTED, PROC. ROY. SOC. A227 466 (1955)

DATA FROM FIGURES

E(EV)	V(10(8)*CM/SEC)	SIGMA(CM(2))
2.30E+02	1.05E-01	1.37E-15
4.00E+02	1.39E-01	1.33E-15
8.00E+02	1.96E-01	1.26E-15
1.60E+03	2.78E-01	1.12E-15
2.20E+03	3.26E-01	1.71E-15
2.70E+03	3.61E-01	1.06E-15
3.30E+03	3.99E-01	1.33E-15
5.00E+03	4.91E-01	1.20E-15
1.00E+04	6.95E-01	1.10E-15
1.50E+04	8.51E-01	9.83E-16
2.00E+04	9.82E-01	9.53E-16
3.00E+04	1.20E+00	1.01E-15
4.00E+04	1.39E+00	1.08E-15

KOOPMAN, PHYS. REV. 154 79 (1967)

DATA FROM FIGURES

E(EV)	V(10(8)*CM/SEC)	SIGMA(CM(2))
9.50E+01	6.77E-02	1.52E-15
1.25E+02	7.77E-02	1.72E-15
1.40E+02	8.22E-02	1.62E-15
1.80E+02	9.32E-02	1.65E-15
2.00E+02	9.82E-02	1.67E-15
2.65E+02	1.13E-01	1.63E-15
2.65E+02	1.13E-01	1.69E-15
3.15E+02	1.23E-01	1.68E-15
3.15E+02	1.23E-01	1.56E-15
4.20E+02	1.42E-01	1.68E-15
4.40E+02	1.46E-01	1.70E-15
4.90E+02	1.54E-01	1.70E-15
5.25E+02	1.59E-01	1.68E-15
5.50E+02	1.63E-01	1.80E-15
5.60E+02	1.64E-01	1.67E-15
6.30E+02	1.74E-01	1.94E-15
7.60E+02	1.91E-01	1.84E-15
8.00E+02	1.96E-01	1.72E-15
8.35E+02	2.01E-01	1.77E-15
8.65E+02	2.04E-01	1.83E-15
9.35E+02	2.12E-01	1.76E-15
9.40E+02	2.13E-01	1.83E-15

Fig.10 $\text{He}^+ + \text{Ne} \rightarrow \text{He}^-$ (σ_{1-1})

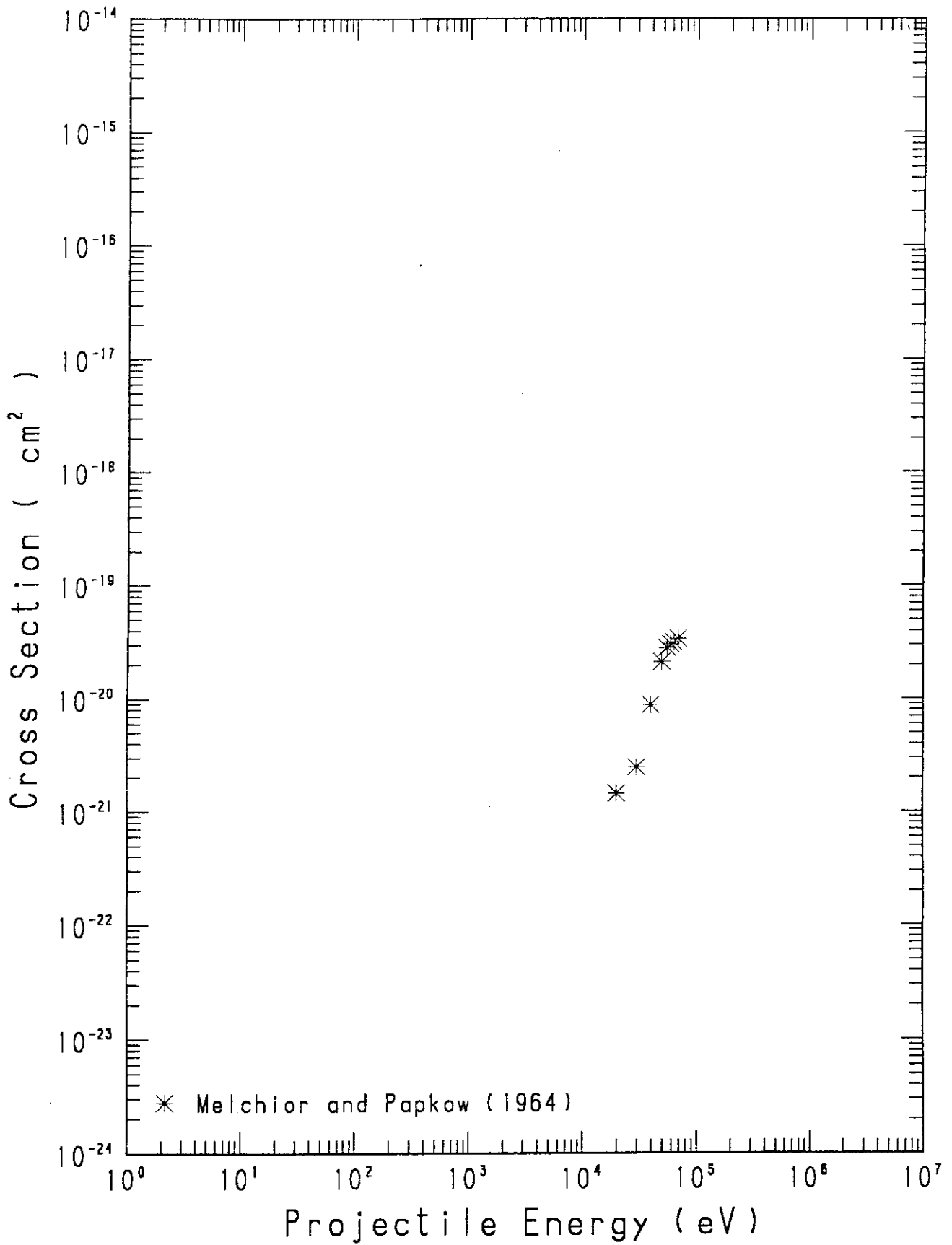


TABLE 10

PROCESS : HE+ + NE = HE- (1-1)
MELCHIOR AND PAPKOW, PHYS. LETT. 8 178 (1964)

DATA FROM FIGURES

E(EV)	V(10(8)*CM/SEC)	SIGMA(CM(2))
2.00E+04	9.82E-01	1.43E-21
3.00E+04	1.20E+00	2.45E-21
4.00E+04	1.39E+00	8.77E-21
5.00E+04	1.55E+00	2.10E-20
5.60E+04	1.64E+00	2.80E-20
6.00E+04	1.70E+00	3.02E-20
6.40E+04	1.76E+00	3.14E-20
7.00E+04	1.84E+00	3.36E-20

Fig.11 $\text{He}^+ + \text{Ar} \rightarrow \text{He}^-$ (σ_{1-1})

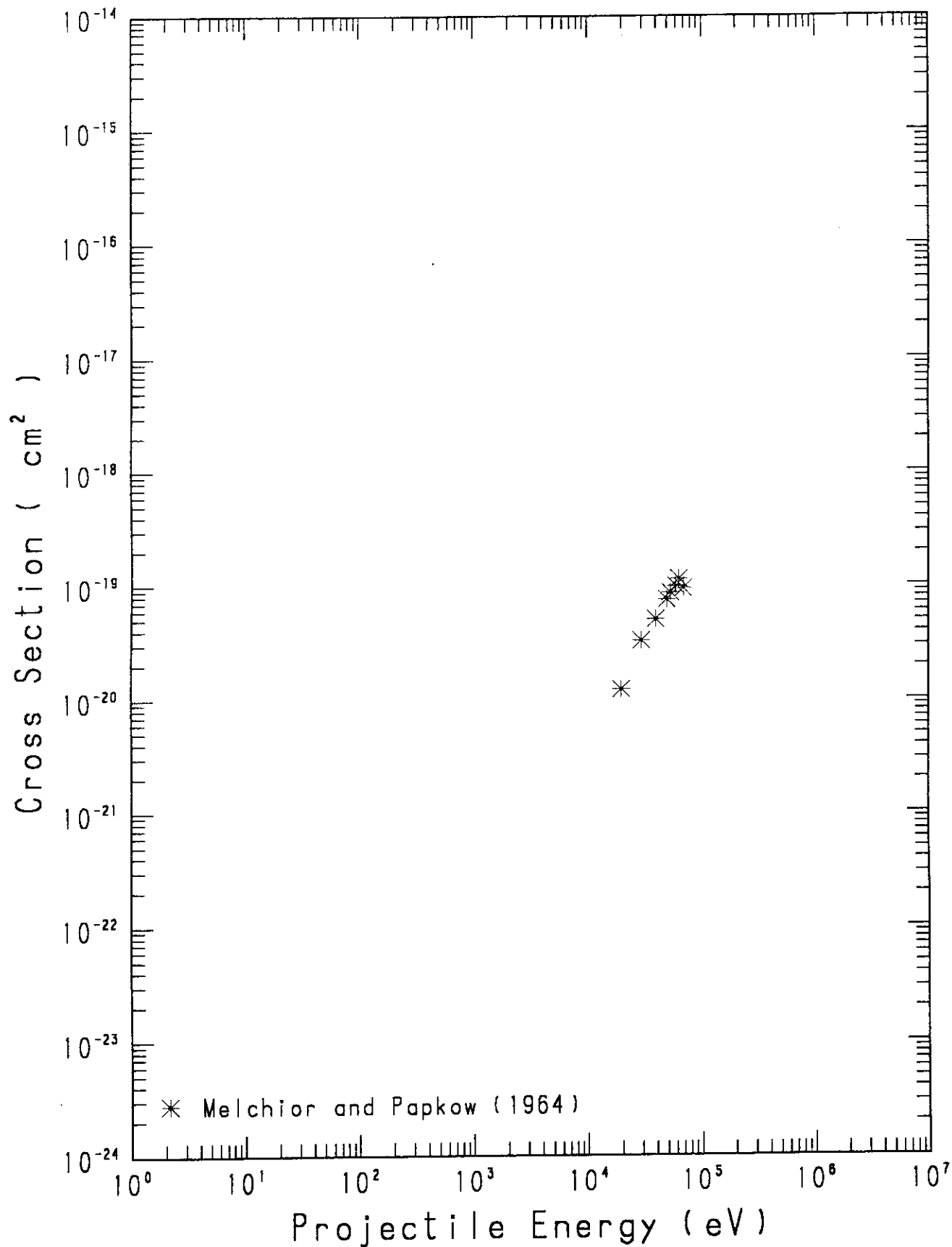


TABLE 11

PROCESS : HE+ + AR = HE- (1-1)
MELCHIOR AND PAPKOW, PHYS. LETT. 8 178 (1964)

DATA FROM FIGURES

E(EV)	V(10(8)*CM/SEC)	SIGMA(CM(2))
2.00E+04	9.82E-01	1.21E-20
3.00E+04	1.20E+00	3.25E-20
4.00E+04	1.39E+00	5.00E-20
5.00E+04	1.55E+00	7.46E-20
5.40E+04	1.61E+00	8.58E-20
6.00E+04	1.70E+00	9.81E-20
6.40E+04	1.76E+00	1.13E-19
7.00E+04	1.84E+00	9.32E-20

Fig.12 $\text{He}^+ + \text{Kr} \rightarrow \text{He}^-$ (σ_{i-1})

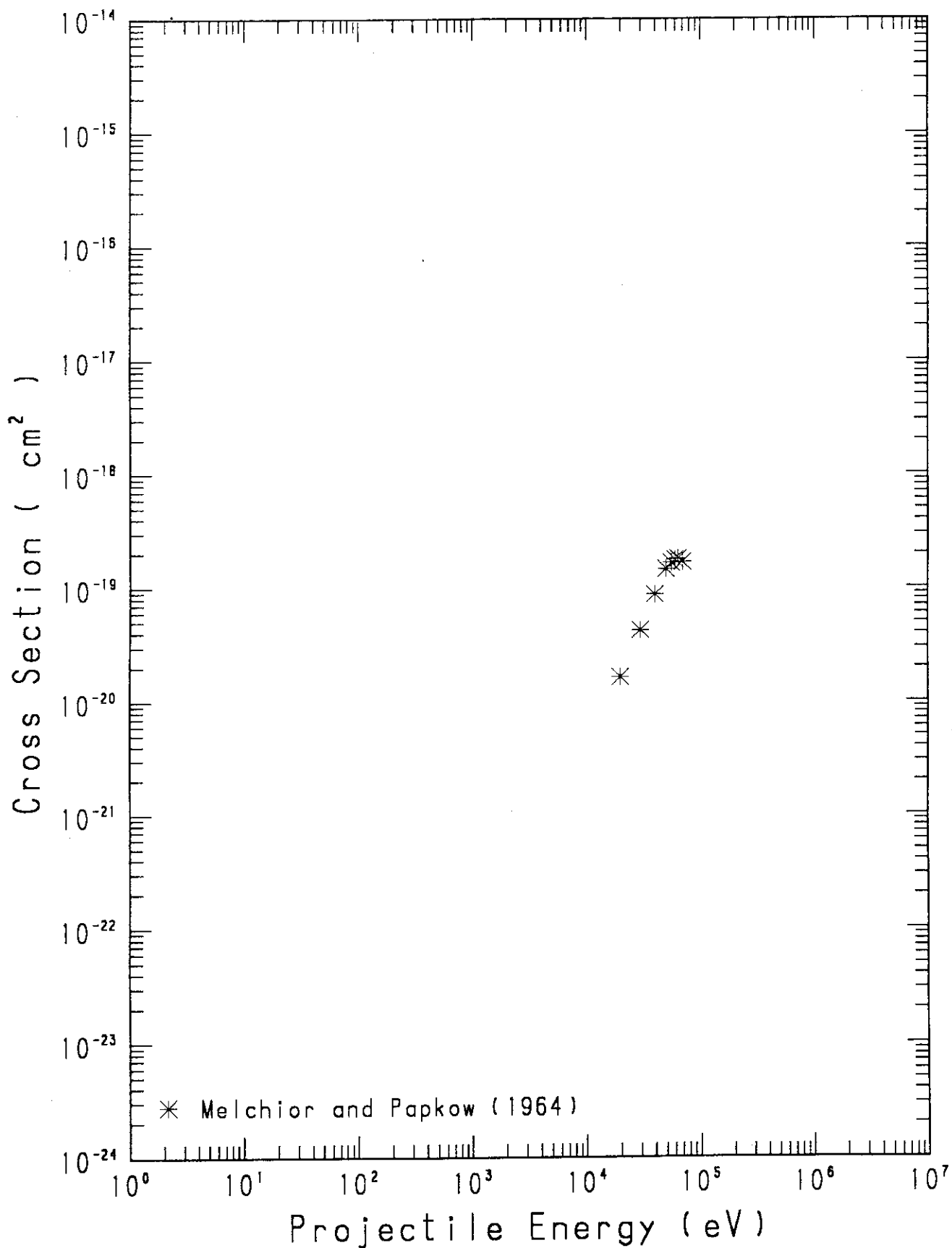


TABLE 12

PROCESS : HE+ + KR = HE- (1-1)
MELCHIOR AND PAPKOW, PHYS. LETT. 8 178 (1964)

DATA FROM FIGURES

E(EV)	V(10(8)*CM/SEC)	SIGMA(CM(2))
2.00E+04	9.82E-01	1.62E-20
3.00E+04	1.20E+00	4.20E-20
4.00E+04	1.39E+00	8.66E-20
5.00E+04	1.55E+00	1.44E-19
5.60E+04	1.64E+00	1.64E-19
6.00E+04	1.70E+00	1.74E-19
6.40E+04	1.76E+00	1.78E-19
7.00E+04	1.84E+00	1.67E-19

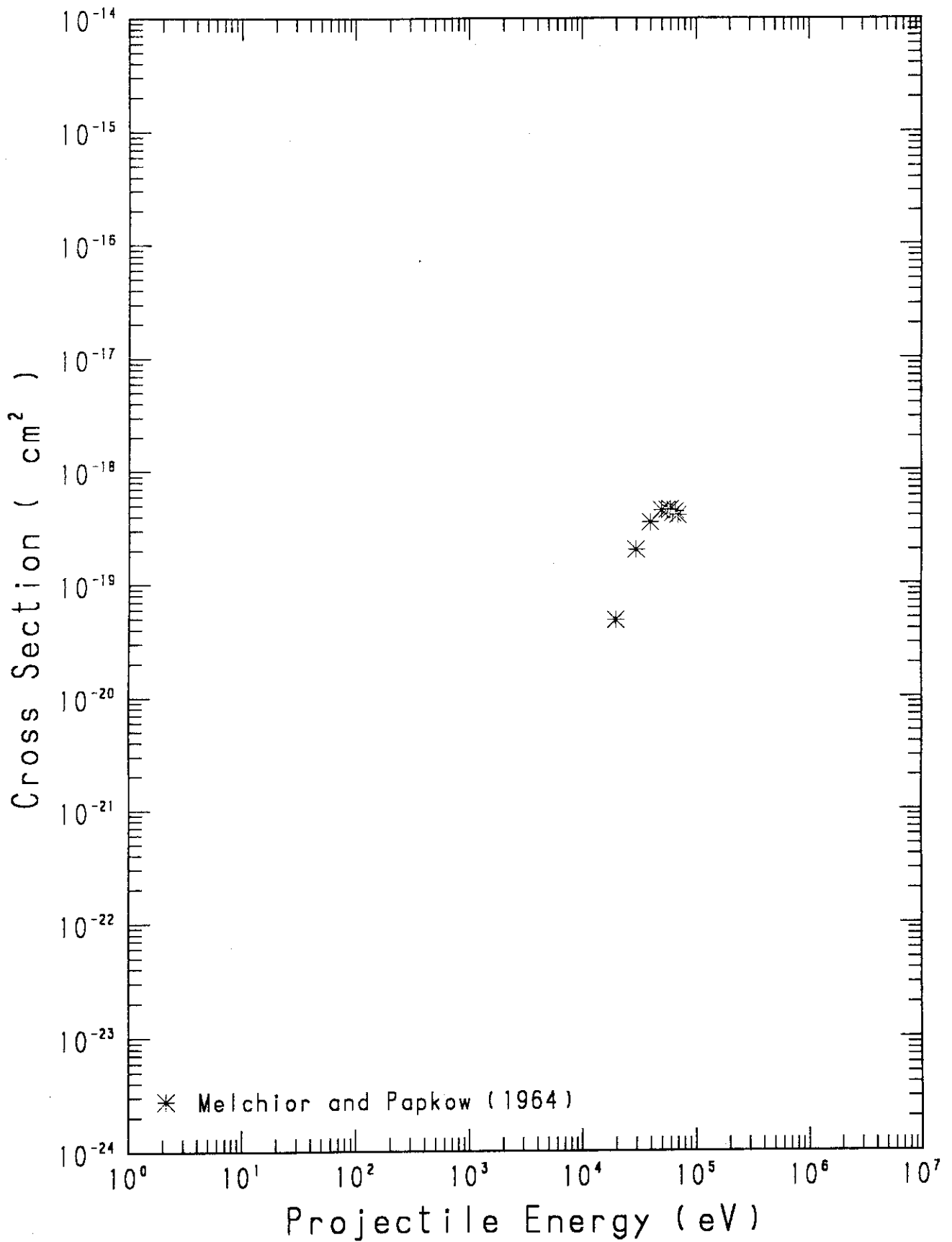
Fig.13 $\text{He}^+ + \text{Xe} \rightarrow \text{He}^-$ (σ_{1-1})

TABLE 13

PROCESS : HE+ + XE = HE- (1-1)
MELCHIOR AND PAPKOW, PHYS. LETT. 8 178 (1964)

DATA FROM FIGURES

E(EV)	V(10(8)*CM/SEC)	SIGMA(CM(2))
2.00E+04	9.82E-01	4.80E-20
3.00E+04	1.20E+00	1.99E-19
4.00E+04	1.39E+00	3.48E-19
5.00E+04	1.55E+00	4.46E-19
5.60E+04	1.64E+00	4.49E-19
6.00E+04	1.70E+00	4.53E-19
6.30E+04	1.74E+00	4.16E-19
6.70E+04	1.80E+00	4.39E-19
7.00E+04	1.84E+00	4.02E-19

Fig.14 $\text{He}^{2+} + \text{He} \rightarrow \text{He}^+$ (σ_{21})

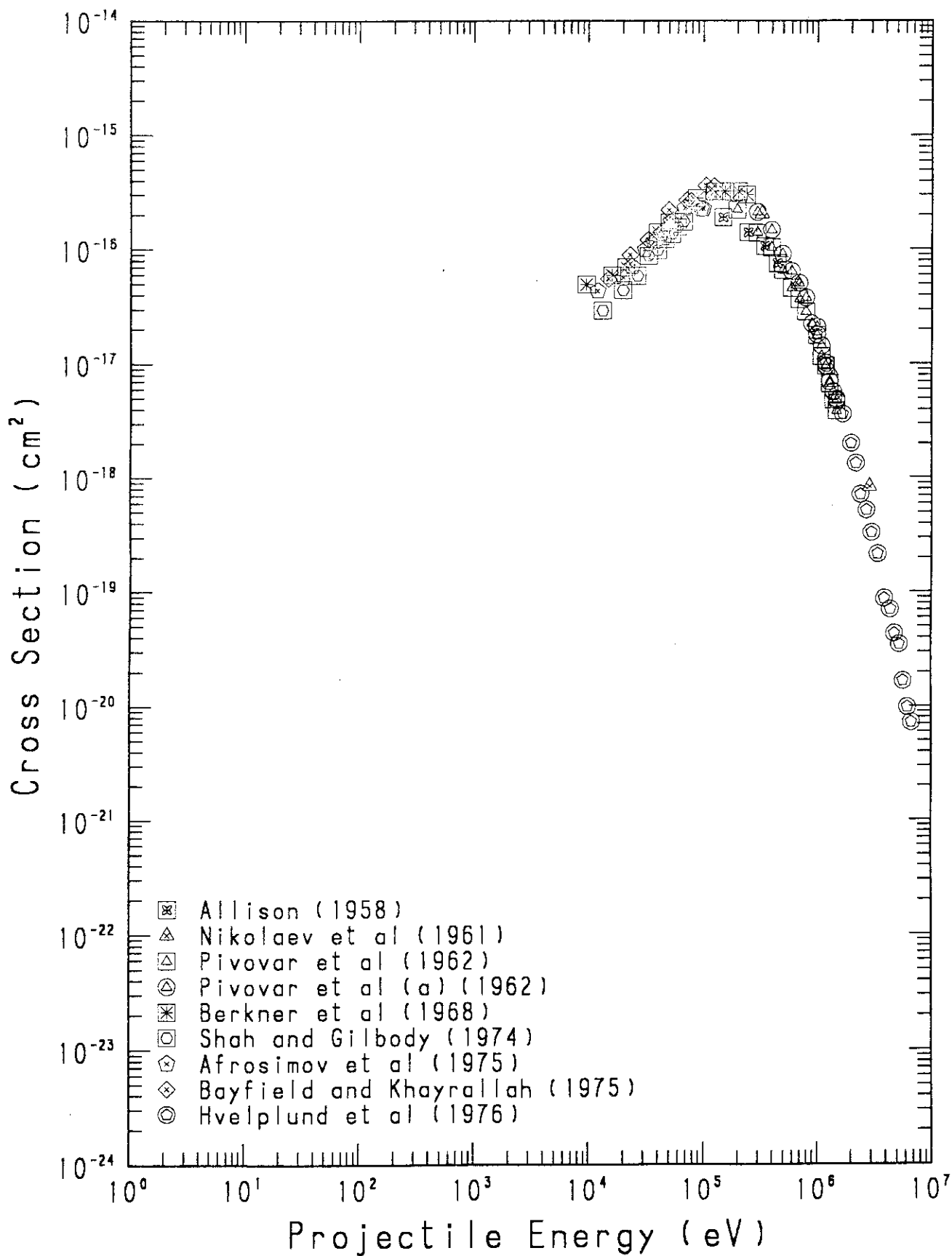


TABLE 14

PROCESS : HE2+ + HE = HE+ (21)
 ALLISON, PHYS. REV. 109 76 (1958)

DATA FROM TABLES

E(EV)	V(10(8)*CM/SEC)	SIGMA(CM(2))
1.50E+05	2.69E+00	1.90E-16
2.50E+05	3.47E+00	1.40E-16
3.50E+05	4.11E+00	1.06E-16
4.50E+05	4.66E+00	7.50E-17

NIKOLAIEV ET AL, SOV. PHYS. JETP 13 695 (1961)

DATA FROM FIGURES

E(EV)	V(10(8)*CM/SEC)	SIGMA(CM(2))
3.28E+05	3.98E+00	2.04E-16
6.80E+05	5.73E+00	4.92E-17
1.32E+06	7.98E+00	8.72E-18
2.88E+06	1.18E+01	8.28E-19

PIVOVAR ET AL, SOV. PHYS. JETP 14 20 (1962)

DATA FROM FIGURES

E(EV)	V(10(8)*CM/SEC)	SIGMA(CM(2))
2.00E+05	3.11E+00	2.22E-16
3.00E+05	3.80E+00	1.39E-16
4.00E+05	4.39E+00	1.03E-16
5.00E+05	4.91E+00	6.53E-17
6.00E+05	5.38E+00	4.55E-17
7.00E+05	5.81E+00	3.65E-17
8.00E+05	6.21E+00	2.84E-17
1.00E+06	6.95E+00	1.77E-17
1.10E+06	7.28E+00	1.16E-17
1.20E+06	7.61E+00	9.59E-18
1.30E+06	7.92E+00	6.68E-18
1.40E+06	8.22E+00	4.80E-18
1.50E+06	8.51E+00	3.85E-18

TABLE 14 -CONTINUED

PIVOVAR ET AL (A), SOV. PHYS. JETP 15 1035 (1962)

DATA FROM FIGURES

E(EV)	V(10(8)*CM/SEC)	SIGMA(CM(2))
3.00E+05	3.80E+00	2.11E-16
4.00E+05	4.39E+00	1.47E-16
5.00E+05	4.91E+00	9.02E-17
6.00E+05	5.38E+00	6.39E-17
7.00E+05	5.81E+00	5.03E-17
8.00E+05	6.21E+00	3.76E-17
9.00E+05	6.59E+00	2.23E-17
1.00E+06	6.95E+00	2.10E-17
1.10E+06	7.28E+00	1.43E-17
1.20E+06	7.61E+00	9.47E-18
1.30E+06	7.92E+00	6.95E-18
1.40E+06	8.22E+00	5.67E-18
1.50E+06	8.51E+00	4.71E-18

BERKNER ET AL, PHYS. REV. 166 44 (1968)

DATA FROM TABLES

E(EV)	V(10(8)*CM/SEC)	SIGMA(CM(2))
9.60E+03	6.81E-01	4.90E-17
1.60E+04	8.79E-01	5.90E-17
2.13E+04	1.01E+00	6.90E-17
4.00E+04	1.39E+00	1.40E-16
5.07E+04	1.56E+00	1.70E-16
8.80E+04	2.06E+00	2.80E-16
1.25E+05	2.46E+00	3.20E-16
1.55E+05	2.73E+00	3.20E-16
2.05E+05	3.15E+00	3.20E-16
2.41E+05	3.41E+00	3.00E-16

SHAH AND GILBODY, J. PHYS. B7 256 (1974)

DATA FROM FIGURES

E(EV)	V(10(8)*CM/SEC)	SIGMA(CM(2))
1.33E+04	8.01E-01	2.90E-17
2.00E+04	9.82E-01	4.35E-17
2.67E+04	1.13E+00	5.81E-17
3.33E+04	1.27E+00	8.71E-17
4.00E+04	1.39E+00	9.68E-17
4.67E+04	1.50E+00	1.21E-16
5.33E+04	1.60E+00	1.35E-16
6.00E+04	1.70E+00	1.55E-16
6.77E+04	1.81E+00	1.74E-16

TABLE 14 -CONTINUED

AFROSIMOV ET AL, SOV. PHYS. JETP 40 661 (1975)

DATA FROM FIGURES

E(EV)	V(10(8)*CM/SEC)	SIGMA(CM(2))
1.20E+04	7.61E-01	4.29E-17
2.00E+04	9.82E-01	5.60E-17
2.40E+04	1.08E+00	7.00E-17
3.10E+04	1.22E+00	9.87E-17
3.70E+04	1.34E+00	1.15E-16
4.30E+04	1.44E+00	1.36E-16
4.90E+04	1.54E+00	1.55E-16
5.20E+04	1.58E+00	1.73E-16
5.50E+04	1.63E+00	1.79E-16
6.90E+04	1.82E+00	2.28E-16
9.60E+04	2.15E+00	2.25E-16
1.00E+05	2.20E+00	2.25E-16

BAYFIELD AND KHAYRALLAH, PHYS. REV A11 920 (1975)

DATA FROM FIGURES

E(EV)	V(10(8)*CM/SEC)	SIGMA(CM(2))
1.50E+04	8.51E-01	5.47E-17
2.30E+04	1.05E+00	8.82E-17
3.30E+04	1.26E+00	1.20E-16
5.00E+04	1.55E+00	2.19E-16
7.20E+04	1.86E+00	2.67E-16
7.80E+04	1.94E+00	2.62E-16
1.06E+05	2.26E+00	3.60E-16
1.25E+05	2.46E+00	3.59E-16

HVELPLUND ET AL, J. PHYS. B9 491 (1976)

DATA FROM FIGURES

E(EV)	V(10(8)*CM/SEC)	SIGMA(CM(2))
1.00E+06	6.95E+00	1.80E-17
1.20E+06	7.61E+00	1.01E-17
1.50E+06	8.51E+00	4.89E-18
1.70E+06	9.06E+00	3.61E-18
2.00E+06	9.82E+00	1.99E-18
2.20E+06	1.03E+01	1.33E-18
2.40E+06	1.08E+01	7.12E-19
2.70E+06	1.14E+01	5.20E-19
3.00E+06	1.20E+01	3.30E-19

TABLE 14 -CONTINUED

3.40E+06	1.28E+01	2.14E-19
3.90E+06	1.37E+01	8.71E-20
4.40E+06	1.46E+01	7.01E-20
4.80E+06	1.52E+01	4.31E-20
5.30E+06	1.60E+01	3.47E-20
5.70E+06	1.66E+01	1.66E-20
6.20E+06	1.73E+01	9.77E-21
6.70E+06	1.80E+01	7.21E-21

Fig.15 $\text{He}^{2+} + \text{Ne} \rightarrow \text{He}^+ (\sigma_{21})$

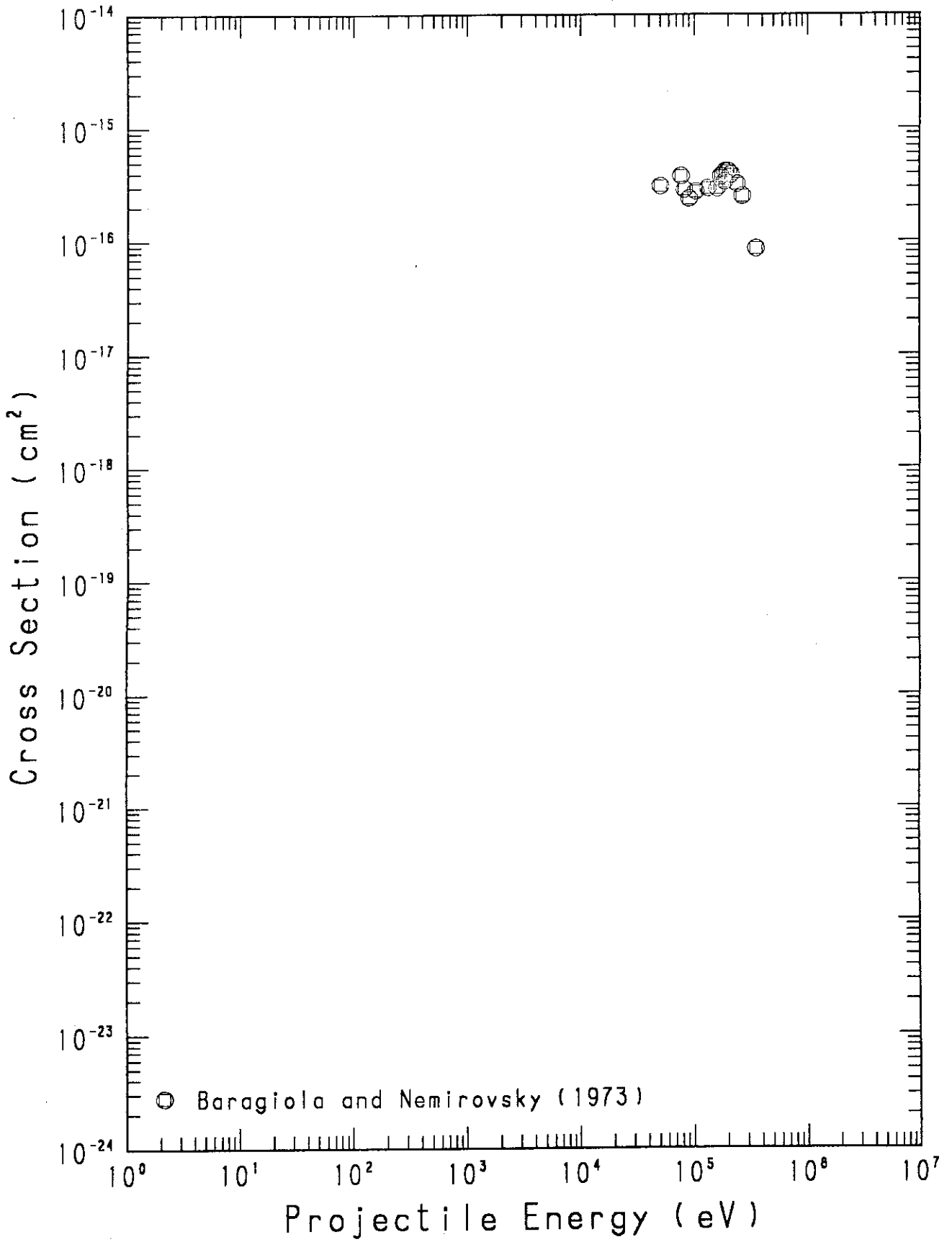


TABLE 15

PROCESS : HE2+ + NE = HE+ (21)
 BARAGIOLA AND NEMIROVSKY, NUCL. INSTR. METH. 110 511 (1973)

DATA FROM FIGURES

E(EV)	V(10(8)*CM/SEC)	SIGMA(CM(2))
5.07E+04	1.56E+00	3.09E-16
7.73E+04	1.93E+00	3.80E-16
8.27E+04	2.00E+00	2.88E-16
9.07E+04	2.09E+00	2.39E-16
1.04E+05	2.24E+00	2.76E-16
1.33E+05	2.53E+00	2.96E-16
1.60E+05	2.78E+00	2.93E-16
1.73E+05	2.89E+00	3.75E-16
1.87E+05	3.00E+00	3.37E-16
1.88E+05	3.01E+00	4.16E-16
2.00E+05	3.11E+00	4.16E-16
2.13E+05	3.21E+00	3.88E-16
2.40E+05	3.40E+00	3.21E-16
2.67E+05	3.59E+00	2.50E-16
3.53E+05	4.13E+00	8.52E-17

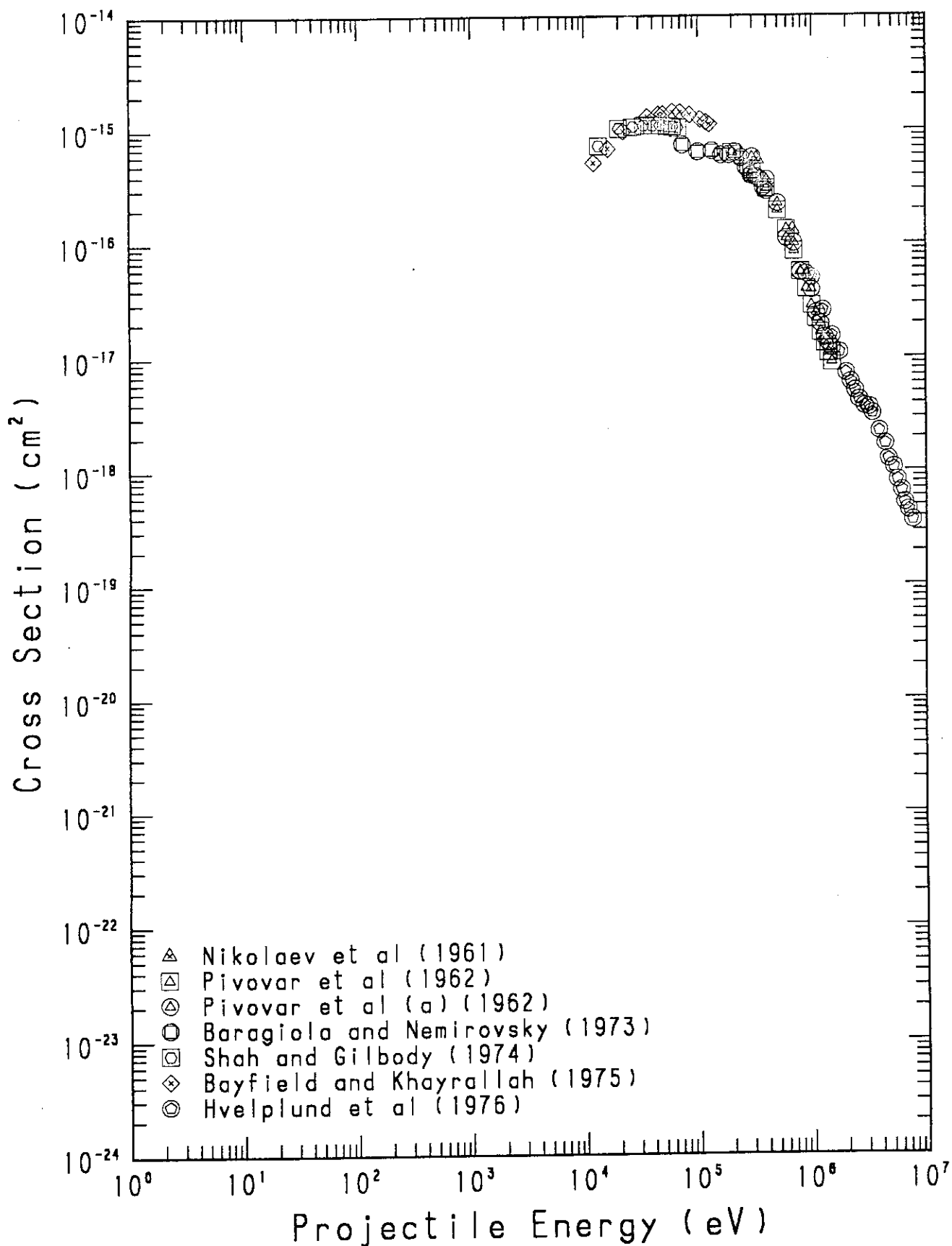
Fig.16 $\text{He}^{2+} + \text{Ar} \rightarrow \text{He}^+$ (σ_{21})

TABLE 16

PROCESS : HE2+ + AR = HE+ (21)
 NIKOLAEV ET AL, SOV. PHYS. JETP 13 695 (1961)

DATA FROM FIGURES

E(EV)	V(10(8)*CM/SEC)	SIGMA(CM(2))
3.28E+05	3.98E+00	5.44E-16
6.80E+05	5.73E+00	1.29E-16
1.32E+06	7.98E+00	1.52E-17

PIVOVAR ET AL, SOV. PHYS. JETP 14 20 (1962)

DATA FROM FIGURES

E(EV)	V(10(8)*CM/SEC)	SIGMA(CM(2))
2.00E+05	3.11E+00	6.28E-16
3.00E+05	3.80E+00	4.40E-16
4.00E+05	4.39E+00	3.03E-16
5.00E+05	4.91E+00	1.94E-16
6.00E+05	5.38E+00	1.32E-16
7.00E+05	5.81E+00	8.52E-17
8.00E+05	6.21E+00	5.61E-17
9.00E+05	6.59E+00	3.99E-17
1.00E+06	6.95E+00	2.84E-17
1.10E+06	7.28E+00	2.18E-17
1.20E+06	7.61E+00	1.65E-17
1.30E+06	7.92E+00	1.33E-17
1.40E+06	8.22E+00	1.09E-17
1.50E+06	8.51E+00	9.02E-18

PIVOVAR ET AL (A), SOV. PHYS. JETP 15 1035 (1962)

DATA FROM FIGURES

E(EV)	V(10(8)*CM/SEC)	SIGMA(CM(2))
3.00E+05	3.80E+00	5.70E-16
4.00E+05	4.39E+00	3.62E-16
5.00E+05	4.91E+00	2.24E-16
6.00E+05	5.38E+00	1.10E-16
7.00E+05	5.81E+00	1.00E-16
8.00E+05	6.21E+00	5.57E-17
9.00E+05	6.59E+00	5.37E-17
1.00E+06	6.95E+00	3.90E-17
1.10E+06	7.28E+00	2.44E-17
1.20E+06	7.61E+00	1.95E-17
1.30E+06	7.92E+00	1.49E-17
1.40E+06	8.22E+00	1.33E-17
1.50E+06	8.51E+00	1.20E-17

TABLE 16 -CONTINUED

BARAGIOLA AND NEMIROVSKY, NUCL. INSTR. METH. 110 511 (1973)

DATA FROM FIGURES

E(EV)	V(10(8)*CM/SEC)	SIGMA(CM(2))
7.33E+04	1.88E+00	7.37E-16
1.00E+05	2.20E+00	6.39E-16
1.33E+05	2.53E+00	6.51E-16
1.60E+05	2.78E+00	5.98E-16
1.87E+05	3.00E+00	5.99E-16
2.13E+05	3.21E+00	6.33E-16
2.40E+05	3.40E+00	5.64E-16
2.67E+05	3.59E+00	4.61E-16
2.93E+05	3.76E+00	3.96E-16
3.20E+05	3.93E+00	3.86E-16
3.47E+05	4.09E+00	3.66E-16
3.73E+05	4.24E+00	3.08E-16
4.00E+05	4.39E+00	2.86E-16

SHAH AND GILBODY, J. PHYS. B7 256 (1974)

DATA FROM FIGURES

E(EV)	V(10(8)*CM/SEC)	SIGMA(CM(2))
1.33E+04	8.01E-01	7.26E-16
2.00E+04	9.82E-01	1.03E-15
2.67E+04	1.13E+00	1.06E-15
3.33E+04	1.27E+00	1.09E-15
4.00E+04	1.39E+00	1.09E-15
4.67E+04	1.50E+00	1.09E-15
5.33E+04	1.60E+00	1.07E-15
6.00E+04	1.70E+00	1.06E-15
6.67E+04	1.79E+00	1.04E-15

BAYFIELD AND KHAYRALLAH, PHYS. REV A11 920 (1975)

DATA FROM FIGURES

E(EV)	V(10(8)*CM/SEC)	SIGMA(CM(2))
1.20E+04	7.61E-01	5.17E-16
1.60E+04	8.79E-01	6.86E-16
2.20E+04	1.03E+00	9.75E-16
3.60E+04	1.32E+00	1.30E-15
4.50E+04	1.47E+00	1.36E-15

TABLE 16 -CONTINUED

4.90E+04	1.54E+00	1.37E-15
6.00E+04	1.70E+00	1.43E-15
7.00E+04	1.84E+00	1.42E-15
8.50E+04	2.02E+00	1.35E-15
1.05E+05	2.25E+00	1.23E-15
1.18E+05	2.39E+00	1.16E-15
1.26E+05	2.47E+00	1.11E-15

HVELPLUND ET AL, J. PHYS. B9 491 (1976)

DATA FROM FIGURES

E(EV)	V(10(8)*CM/SEC)	SIGMA(CM(2))
1.00E+06	6.95E+00	5.00E-17
1.25E+06	7.77E+00	2.58E-17
1.50E+06	8.51E+00	1.53E-17
1.75E+06	9.19E+00	1.10E-17
2.00E+06	9.82E+00	7.25E-18
2.20E+06	1.03E+01	6.03E-18
2.40E+06	1.08E+01	5.07E-18
2.60E+06	1.12E+01	4.22E-18
2.90E+06	1.18E+01	3.70E-18
3.20E+06	1.24E+01	3.62E-18
3.40E+06	1.28E+01	3.18E-18
3.90E+06	1.37E+01	2.22E-18
4.40E+06	1.46E+01	1.71E-18
4.70E+06	1.51E+01	1.25E-18
5.20E+06	1.58E+01	1.06E-18
5.60E+06	1.64E+01	8.19E-19
6.10E+06	1.72E+01	6.59E-19
6.50E+06	1.77E+01	5.19E-19
7.00E+06	1.84E+01	4.46E-19
7.60E+06	1.91E+01	3.63E-19

Fig.17 $\text{He}^{2+} + \text{Kr} \rightarrow \text{He}^+$ (σ_{21})

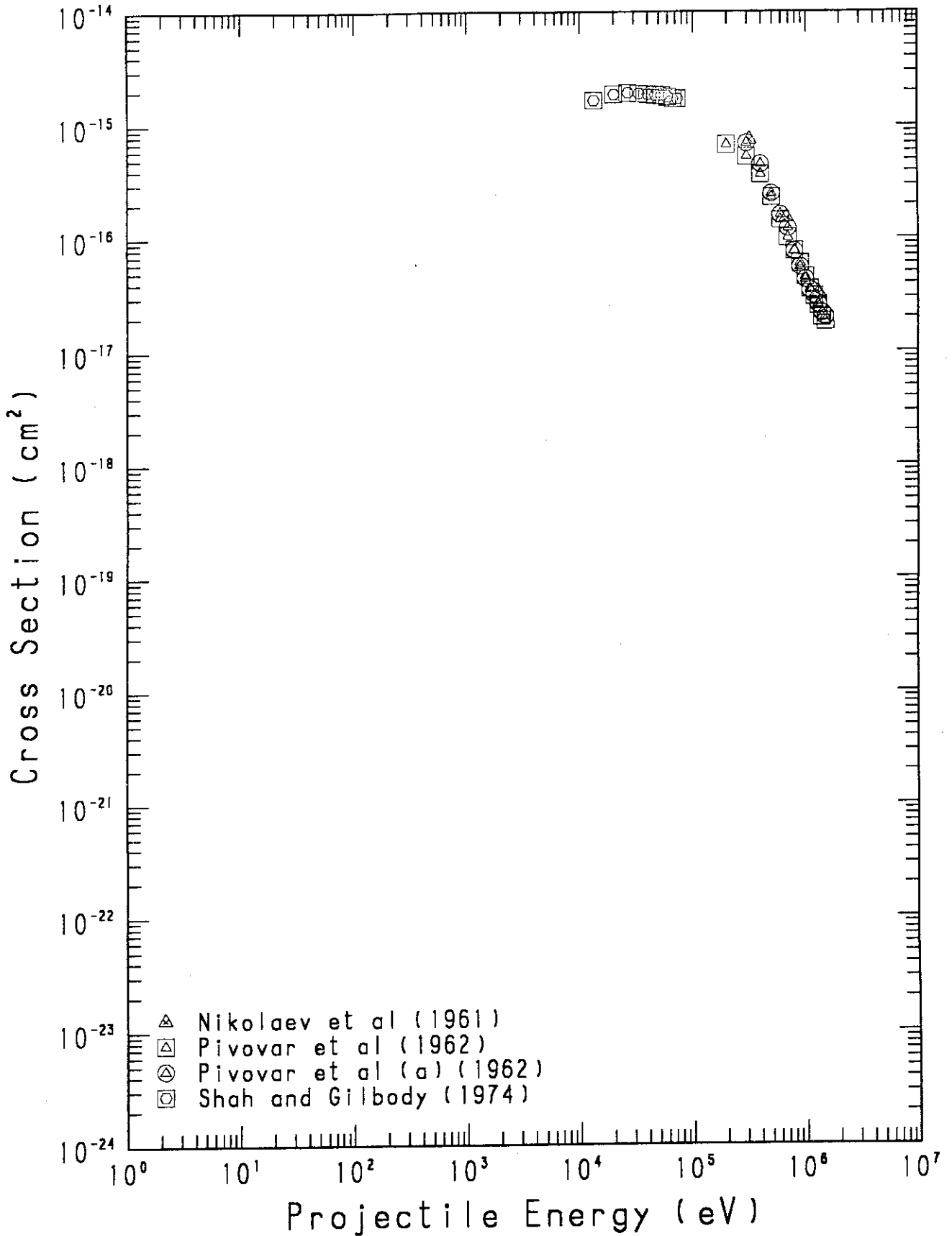


TABLE 17

PROCESS : HE2+ + KR = HE+ (21)
 NIKOLAEV ET AL, SOV. PHYS. JETP 13 695 (1961)

DATA FROM FIGURES

E(EV)	V(10(8)*CM/SEC)	SIGMA(CM(2))
3.20E+05	3.93E+00	7.37E-16
6.80E+05	5.73E+00	1.49E-16
1.32E+06	7.98E+00	3.18E-17

PIVOVAR ET AL (A), SOV. PHYS. JETP 15 1035 (1962)

DATA FROM FIGURES

E(EV)	V(10(8)*CM/SEC)	SIGMA(CM(2))
3.00E+05	3.80E+00	6.90E-16
4.00E+05	4.39E+00	4.51E-16
5.00E+05	4.91E+00	2.47E-16
6.00E+05	5.38E+00	1.59E-16
7.00E+05	5.81E+00	1.21E-16
8.00E+05	6.21E+00	7.57E-17
9.00E+05	6.59E+00	5.51E-17
1.00E+06	6.95E+00	4.29E-17
1.10E+06	7.28E+00	3.43E-17
1.20E+06	7.61E+00	3.10E-17
1.30E+06	7.92E+00	2.58E-17
1.40E+06	8.22E+00	2.18E-17
1.50E+06	8.51E+00	2.00E-17

PIVOVAR ET AL, SOV. PHYS. JETP 14 20 (1962)

DATA FROM FIGURES

E(EV)	V(10(8)*CM/SEC)	SIGMA(CM(2))
2.00E+05	3.11E+00	6.73E-16
3.00E+05	3.80E+00	5.28E-16
4.00E+05	4.39E+00	3.67E-16
5.00E+05	4.91E+00	2.29E-16
6.00E+05	5.38E+00	1.43E-16
7.00E+05	5.81E+00	1.00E-16
8.00E+05	6.21E+00	7.67E-17
9.00E+05	6.59E+00	5.92E-17
1.00E+06	6.95E+00	4.51E-17
1.10E+06	7.28E+00	3.53E-17
1.20E+06	7.61E+00	3.03E-17
1.30E+06	7.92E+00	2.53E-17
1.40E+06	8.22E+00	1.98E-17
1.50E+06	8.51E+00	1.84E-17

TABLE 17 -CONTINUED

SHAH AND GILBODY, J. PHYS. B7 256 (1974)

DATA FROM FIGURES

E(EV)	V(10(8)*CM/SEC)	SIGMA(CM(2))
1.33E+04	8.01E-01	1.65E-15
2.00E+04	9.82E-01	1.86E-15
2.67E+04	1.13E+00	1.92E-15
3.33E+04	1.27E+00	1.89E-15
4.00E+04	1.39E+00	1.86E-15
4.67E+04	1.50E+00	1.83E-15
5.33E+04	1.60E+00	1.82E-15
6.00E+04	1.70E+00	1.76E-15
6.67E+04	1.79E+00	1.70E-15
7.33E+04	1.88E+00	1.70E-15

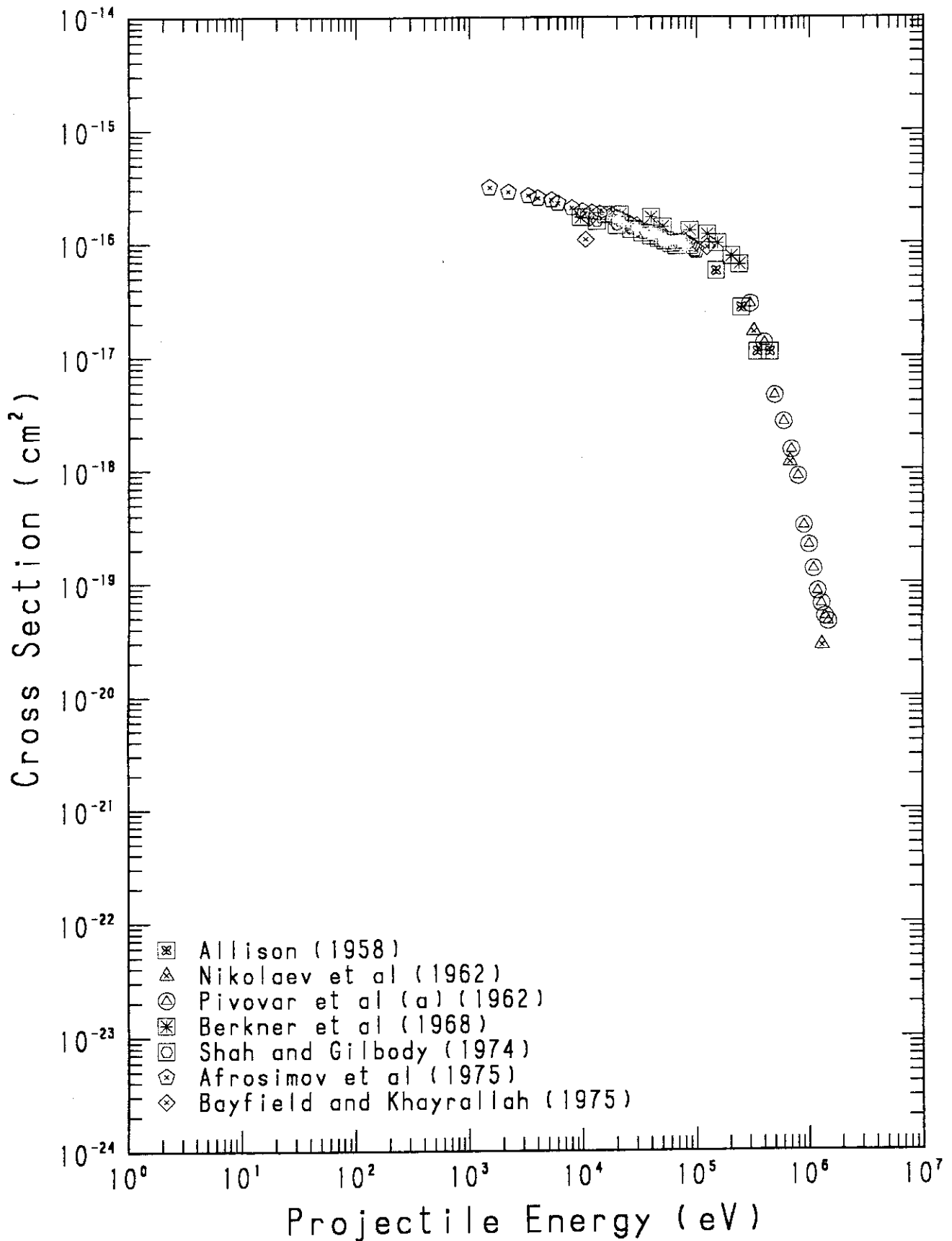
Fig.18 $\text{He}^{2+} + \text{He} \rightarrow \text{He} \quad (\sigma_{20})$ 

TABLE 18

PROCESS : HE2+ + HE = HE (20)
 ALLISON, PHYS. REV. 109 76 (1958)

DATA FROM TABLES

E(EV)	V(10(8)*CM/SEC)	SIGMA(CM(2))
1.50E+05	2.69E+00	5.70E-17
2.50E+05	3.47E+00	2.70E-17
3.50E+05	4.11E+00	1.10E-17
4.50E+05	4.66E+00	1.10E-17

NIKOLAEV ET AL, SOV. PHYS. JETP 14 67 (1962)

DATA FROM FIGURES

E(EV)	V(10(8)*CM/SEC)	SIGMA(CM(2))
3.24E+05	3.95E+00	1.65E-17
6.80E+05	5.73E+00	1.16E-18
1.32E+06	7.98E+00	2.79E-20

PIVOVAR ET AL (A), SOV. PHYS. JETP 15 1035 (1962)

DATA FROM FIGURES

E(EV)	V(10(8)*CM/SEC)	SIGMA(CM(2))
3.00E+05	3.80E+00	2.91E-17
4.00E+05	4.39E+00	1.32E-17
5.00E+05	4.91E+00	4.54E-18
6.00E+05	5.38E+00	2.65E-18
7.00E+05	5.81E+00	1.49E-18
8.00E+05	6.21E+00	8.70E-19
9.00E+05	6.59E+00	3.21E-19
1.00E+06	6.95E+00	2.15E-19
1.10E+06	7.28E+00	1.32E-19
1.20E+06	7.61E+00	8.43E-20
1.30E+06	7.92E+00	6.53E-20
1.40E+06	8.22E+00	5.05E-20
1.50E+06	8.51E+00	4.51E-20

TABLE 18 -CONTINUED

BERKNER ET AL, PHYS. REV. 166 44 (1968)

DATA FROM FIGURES

E(EV)	V(10(8)*CM/SEC)	SIGMA(CM(2))
9.60E+03	6.81E-01	1.70E-16
1.60E+04	8.79E-01	1.80E-16
2.13E+04	1.01E+00	1.80E-16
4.00E+04	1.39E+00	1.70E-16
5.07E+04	1.56E+00	1.40E-16
8.80E+04	2.06E+00	1.30E-16
1.25E+05	2.46E+00	1.20E-16
1.55E+05	2.73E+00	1.00E-16
2.05E+05	3.15E+00	7.70E-17
2.41E+05	3.41E+00	6.50E-17

SHAH AND GILBODY, J. PHYS. B7 256 (1974)

DATA FROM FIGURES

E(EV)	V(10(8)*CM/SEC)	SIGMA(CM(2))
1.33E+04	8.01E-01	1.57E-16
2.00E+04	9.82E-01	1.44E-16
2.67E+04	1.13E+00	1.32E-16
3.33E+04	1.27E+00	1.23E-16
4.00E+04	1.39E+00	1.16E-16
4.67E+04	1.50E+00	1.09E-16
5.33E+04	1.60E+00	1.05E-16
6.00E+04	1.70E+00	9.92E-17
6.67E+04	1.79E+00	9.46E-17

AFROSIMOV ET AL, SOV. PHYS. JETP 40 661 (1975)

DATA FROM FIGURES

E(EV)	V(10(8)*CM/SEC)	SIGMA(CM(2))
1.50E+03	2.69E-01	3.14E-16
2.20E+03	3.26E-01	2.86E-16
3.30E+03	3.99E-01	2.66E-16
4.00E+03	4.39E-01	2.53E-16
5.30E+03	5.06E-01	2.42E-16
6.00E+03	5.38E-01	2.27E-16
8.00E+03	6.21E-01	2.07E-16
1.00E+04	6.95E-01	1.93E-16
1.20E+04	7.61E-01	1.88E-16
1.40E+04	8.22E-01	1.85E-16
1.60E+04	8.79E-01	1.78E-16
1.80E+04	9.32E-01	1.77E-16

TABLE 18 -CONTINUED

2.00E+04	9.82E-01	1.69E-16
2.20E+04	1.03E+00	1.62E-16
2.40E+04	1.08E+00	1.55E-16
2.60E+04	1.12E+00	1.49E-16
2.80E+04	1.16E+00	1.40E-16
3.10E+04	1.22E+00	1.35E-16
3.30E+04	1.26E+00	1.30E-16
3.50E+04	1.30E+00	1.26E-16
3.70E+04	1.34E+00	1.25E-16
4.00E+04	1.39E+00	1.23E-16
4.20E+04	1.42E+00	1.18E-16
4.40E+04	1.46E+00	1.11E-16
4.80E+04	1.52E+00	1.07E-16
5.20E+04	1.58E+00	1.05E-16
5.60E+04	1.64E+00	1.01E-16
6.00E+04	1.70E+00	1.00E-16
6.40E+04	1.76E+00	1.02E-16
6.80E+04	1.81E+00	1.02E-16
7.20E+04	1.86E+00	1.02E-16
7.60E+04	1.91E+00	1.01E-16
8.00E+04	1.96E+00	1.01E-16
8.40E+04	2.01E+00	9.74E-17
8.80E+04	2.06E+00	9.64E-17
9.20E+04	2.11E+00	9.15E-17
9.60E+04	2.15E+00	8.80E-17
1.00E+05	2.20E+00	8.56E-17

BAYFIELD AND KHAYRALLAH, PHYS. REV A11 920 (1975)

DATA FROM FIGURES

E (EV)	V(10(8)*CM/SEC)	SIGMA(CM(2))
1.15E+04	7.45E-01	1.68E-16
2.00E+04	9.82E-01	1.52E-16
3.00E+04	1.20E+00	1.45E-16
4.80E+04	1.52E+00	1.19E-16
7.80E+04	1.94E+00	1.06E-16
1.06E+04	7.15E-01	1.08E-16
1.25E+05	2.46E+00	9.24E-17

Fig.19 $\text{He}^{2+} + \text{Ne} \rightarrow \text{He} (\sigma_{20})$

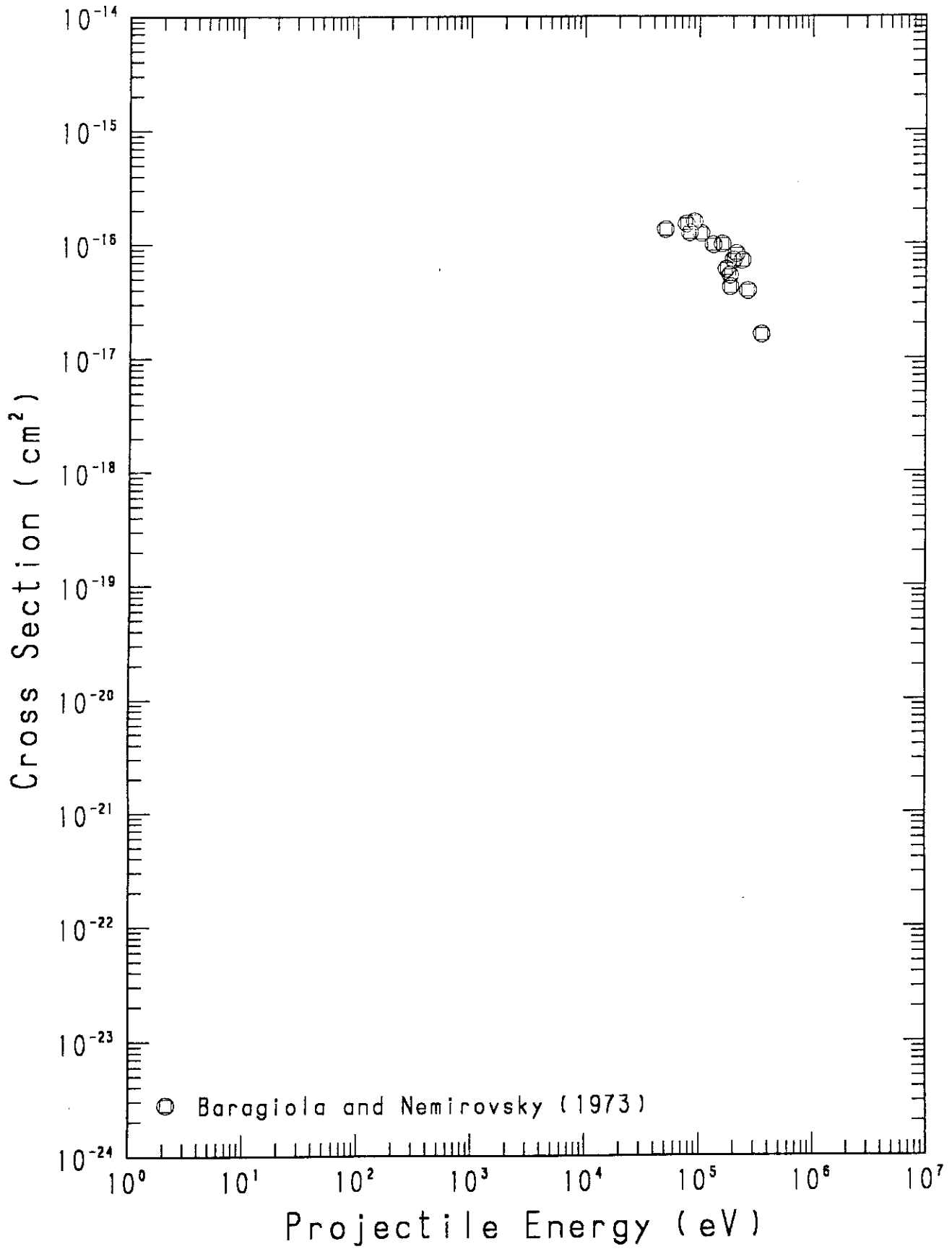


TABLE 19

PROCESS : HE2+ + NE = HE (20)
 BARAGIOLA AND NEMIROVSKY, NUCL. INSTR. METH. 110 511 (1973)

DATA FROM FIGURES

E(EV)	V(10(8)*CM/SEC)	SIGMA(CM(2))
5.07E+04	1.56E+00	1.33E-16
7.73E+04	1.93E+00	1.49E-16
8.27E+04	2.00E+00	1.24E-16
9.07E+04	2.09E+00	1.56E-16
1.04E+05	2.24E+00	1.23E-16
1.33E+05	2.53E+00	9.74E-17
1.60E+05	2.78E+00	9.86E-17
1.73E+05	2.89E+00	5.94E-17
1.87E+05	3.00E+00	5.26E-17
1.88E+05	3.01E+00	4.16E-17
2.00E+05	3.11E+00	7.13E-17
2.13E+05	3.21E+00	8.11E-17
2.40E+05	3.40E+00	7.07E-17
2.67E+05	3.59E+00	3.85E-17
3.53E+05	4.13E+00	1.60E-17

Fig.20 $\text{He}^{2+} + \text{Ar} \rightarrow \text{He} \ (\sigma_{20})$

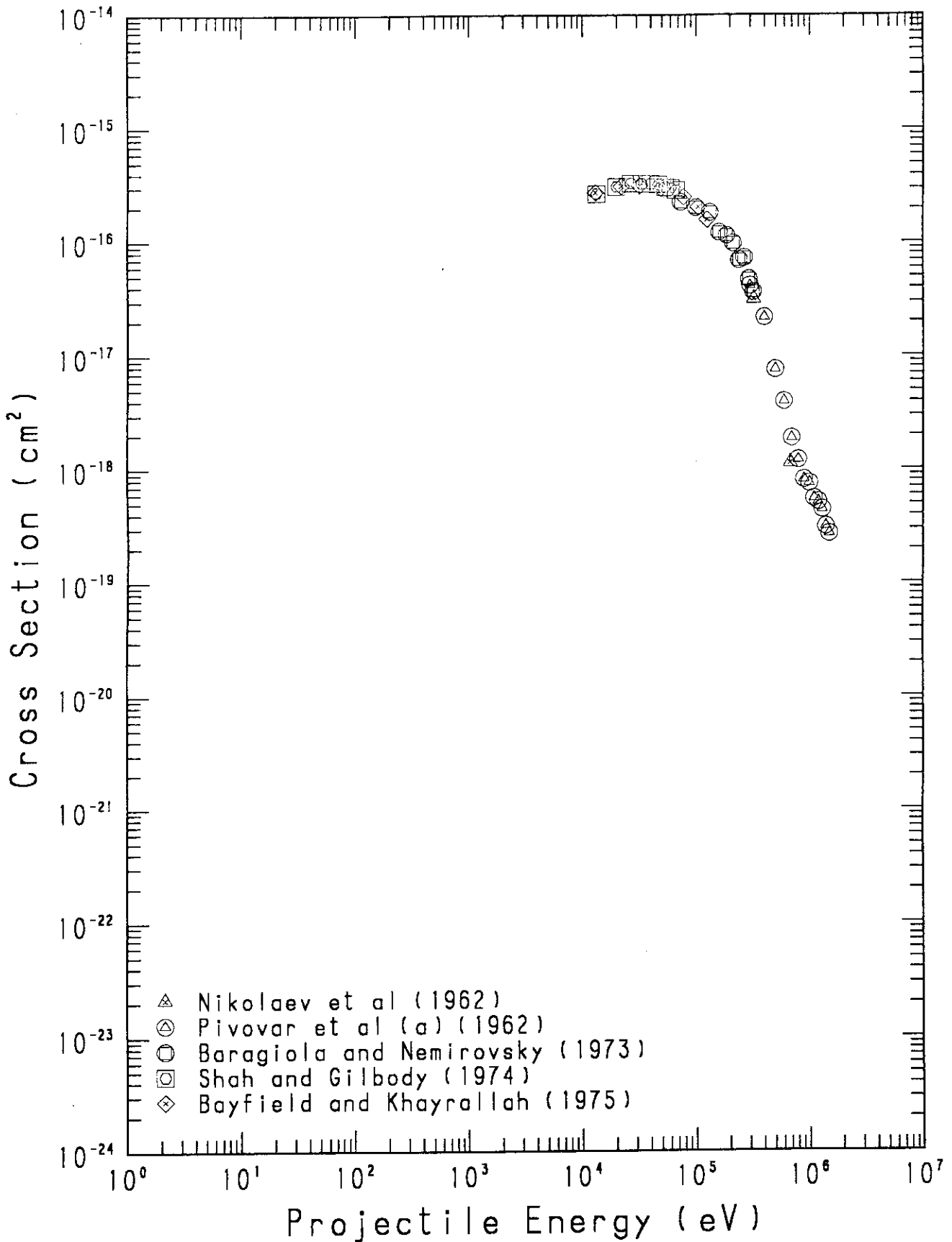


TABLE 20

PROCESS : HE2+ + AR = HE (20)
 NIKOLAEV ET AL, SOV. PHYS. JETP 14 67 (1962)

DATA FROM FIGURES

E(EV)	V(10(8)*CM/SEC)	SIGMA(CM(2))
3.24E+05	3.95E+00	3.14E-17
6.80E+05	5.73E+00	1.12E-18

PIVOVAR ET AL (A), SOV. PHYS. JETP 15 1035 (1962)

DATA FROM FIGURES

E(EV)	V(10(8)*CM/SEC)	SIGMA(CM(2))
3.00E+05	3.80E+00	4.13E-17
4.00E+05	4.39E+00	2.17E-17
5.00E+05	4.91E+00	7.53E-18
6.00E+05	5.38E+00	3.96E-18
7.00E+05	5.81E+00	1.87E-18
8.00E+05	6.21E+00	1.20E-18
9.00E+05	6.59E+00	8.06E-19
1.00E+06	6.95E+00	7.46E-19
1.10E+06	7.28E+00	5.49E-19
1.20E+06	7.61E+00	5.15E-19
1.30E+06	7.92E+00	4.40E-19
1.40E+06	8.22E+00	3.11E-19
1.50E+06	8.51E+00	2.69E-19

BARAGIOLA AND NEMIROVSKY, NUCL. INSTR. METH. 110 511 (1973)

DATA FROM FIGURES

E(EV)	V(10(8)*CM/SEC)	SIGMA(CM(2))
7.33E+04	1.88E+00	2.25E-16
1.00E+05	2.20E+00	2.01E-16
1.33E+05	2.53E+00	1.83E-16
1.60E+05	2.78E+00	1.22E-16
1.87E+05	3.00E+00	1.14E-16
2.13E+05	3.21E+00	9.76E-17
2.40E+05	3.40E+00	6.95E-17
2.67E+05	3.59E+00	7.26E-17
2.93E+05	3.76E+00	4.72E-17
3.20E+05	3.93E+00	3.64E-17

TABLE 20 -CONTINUED

SHAH AND GILBODY, J. PHYS. B7 256 (1974)

DATA FROM FIGURES

E(EV)	V(10(8)*CM/SEC)	SIGMA(CM(2))
1.33E+04	8.01E-01	2.68E-16
2.00E+04	9.82E-01	3.10E-16
2.67E+04	1.13E+00	3.31E-16
3.33E+04	1.27E+00	3.27E-16
4.00E+04	1.39E+00	3.28E-16
4.67E+04	1.50E+00	3.22E-16
5.33E+04	1.60E+00	3.07E-16
6.00E+04	1.70E+00	2.99E-16
6.67E+04	1.79E+00	2.87E-16

BAYFIELD AND KHAYRALLAH, PHYS. REV A11 920 (1975)

DATA FROM FIGURES

E(EV)	V(10(8)*CM/SEC)	SIGMA(CM(2))
1.30E+04	7.92E-01	2.75E-16
2.20E+04	1.03E+00	3.12E-16
3.20E+04	1.24E+00	3.15E-16
4.90E+04	1.54E+00	2.99E-16
7.80E+04	1.94E+00	2.50E-16
1.05E+05	2.25E+00	2.04E-16
1.26E+05	2.47E+00	1.57E-16

Fig.21 $\text{He}^{2+} + \text{Kr} \rightarrow \text{He} \ (\sigma_{20})$

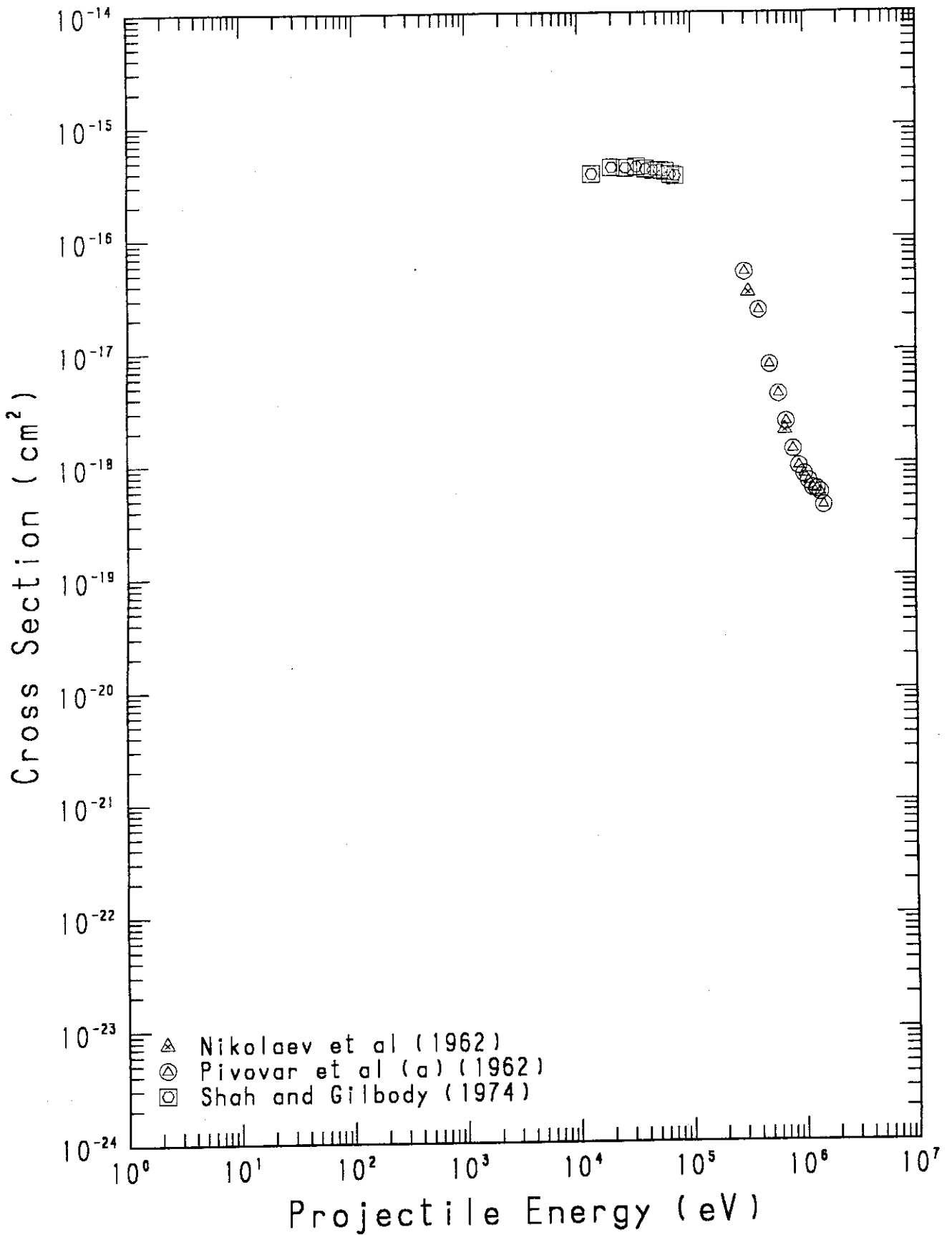


TABLE 21

PROCESS : HE2+ + KR = HE (20)
 NIKOLAEV ET AL, SOV. PHYS. JETP 14 67 (1962)

DATA FROM FIGURES

E(EV)	V(10(8)*CM/SEC)	SIGMA(CM(2))
3.24E+05	3.95E+00	3.27E-17
6.80E+05	5.73E+00	1.96E-18

PIVOVAR ET AL (A), SOV. PHYS. JETP 15 1035 (1962)

DATA FROM FIGURES

E(EV)	V(10(8)*CM/SEC)	SIGMA(CM(2))
3.00E+05	3.80E+00	4.96E-17
4.00E+05	4.39E+00	2.28E-17
5.00E+05	4.91E+00	7.49E-18
6.00E+05	5.38E+00	4.11E-18
7.00E+05	5.81E+00	2.34E-18
8.00E+05	6.21E+00	1.32E-18
9.00E+05	6.59E+00	9.35E-19
1.00E+06	6.95E+00	7.89E-19
1.10E+06	7.28E+00	6.85E-19
1.20E+06	7.61E+00	5.94E-19
1.30E+06	7.92E+00	5.82E-19
1.40E+06	8.22E+00	5.47E-19
1.50E+06	8.51E+00	4.20E-19

SHAH AND GILBODY, J. PHYS. B7 256 (1974)

DATA FROM FIGURES

E(EV)	V(10(8)*CM/SEC)	SIGMA(CM(2))
1.33E+04	8.01E-01	3.74E-16
2.00E+04	9.82E-01	4.26E-16
2.67E+04	1.13E+00	4.21E-16
3.33E+04	1.27E+00	4.32E-16
4.00E+04	1.39E+00	4.12E-16
4.67E+04	1.50E+00	4.00E-16
5.33E+04	1.60E+00	4.02E-16
6.00E+04	1.70E+00	3.92E-16
6.67E+04	1.79E+00	3.66E-16
7.33E+04	1.88E+00	3.58E-16

Fig.22 $\text{He}^- + \text{He} \rightarrow \text{He} \quad (\sigma_{-10})$

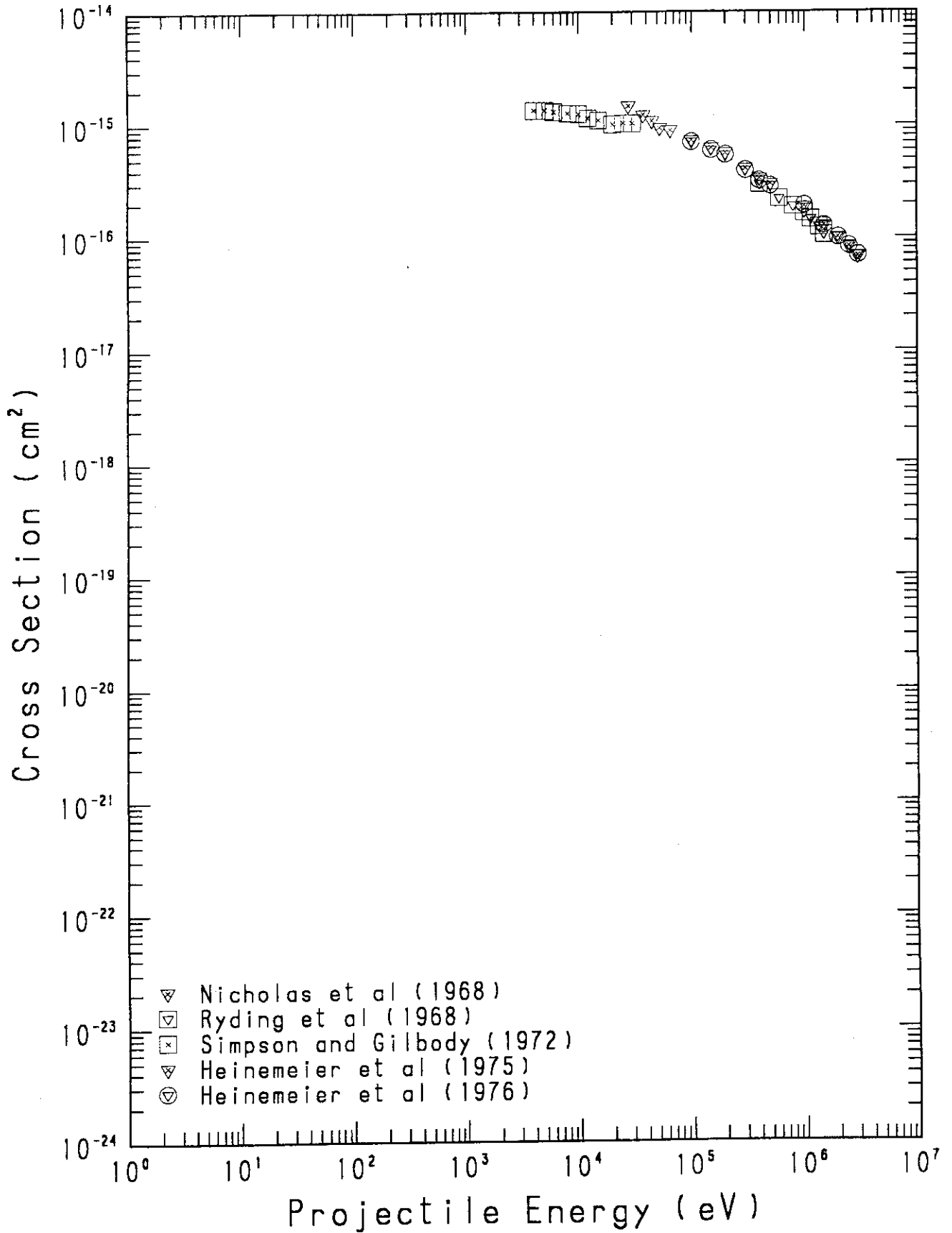


TABLE 22

PROCESS : HE- + HE = HE (-10)
 NICHOLAS ET AL, PHYS. REV. 167 38 (1968)

DATA FROM FIGURES

E(EV)	V(10(8)*CM/SEC)	SIGMA(CM(2))
2.77E+04	1.16E+00	1.47E-15
3.73E+04	1.34E+00	1.22E-15
4.47E+04	1.47E+00	1.08E-15
5.25E+04	1.59E+00	9.34E-16
6.50E+04	1.77E+00	8.93E-16

RYDING ET AL, PHYS. REV. 174 149 (1968)

DATA FROM TABLES

E(EV)	V(10(8)*CM/SEC)	SIGMA(CM(2))
4.00E+05	4.39E+00	2.97E-16
6.00E+05	5.38E+00	2.21E-16
8.00E+05	6.21E+00	1.89E-16
1.00E+06	6.95E+00	1.65E-16
1.15E+06	7.45E+00	1.45E-16
1.35E+06	8.07E+00	1.23E-16
1.50E+06	8.51E+00	1.05E-16

SIMPSON AND GILBODY, J. PHYS. B5 1959 (1972)

DATA FROM FIGURES

E(EV)	V(10(8)*CM/SEC)	SIGMA(CM(2))
4.00E+03	4.39E-01	1.35E-15
5.00E+03	4.91E-01	1.35E-15
6.00E+03	5.38E-01	1.31E-15
8.00E+03	6.21E-01	1.27E-15
1.00E+04	6.95E-01	1.25E-15
1.20E+04	7.61E-01	1.15E-15
1.50E+04	8.51E-01	1.10E-15
2.00E+04	9.82E-01	1.01E-15
2.50E+04	1.10E+00	1.03E-15
3.00E+04	1.20E+00	1.03E-15

TABLE 22 -CONTINUED

HEINEMEIER ET AL, J. PHYS. B8 1880 (1975)

DATA FROM FIGURES

E(EV)	V(10(8)*CM/SEC)	SIGMA(CM(2))
1.00E+05	2.20E+00	7.27E-16
1.50E+05	2.69E+00	6.23E-16
2.00E+05	3.11E+00	5.62E-16
3.00E+05	3.80E+00	4.11E-16
4.00E+05	4.39E+00	3.34E-16
5.00E+05	4.91E+00	3.01E-16
1.00E+06	6.95E+00	1.87E-16
1.50E+06	8.51E+00	1.26E-16
2.00E+06	9.82E+00	1.00E-16
2.50E+06	1.10E+01	8.29E-17
3.00E+06	1.20E+01	6.80E-17

HEINEMEIER ET AL, J. PHYS. B9 2669 (1976)

DATA FROM TABLES

E(EV)	V(10(8)*CM/SEC)	SIGMA(CM(2))
1.00E+05	2.20E+00	7.09E-16
1.50E+05	2.69E+00	6.00E-16
2.00E+05	3.11E+00	5.45E-16
3.00E+05	3.80E+00	3.97E-16
4.00E+05	4.39E+00	3.21E-16
5.00E+05	4.91E+00	2.88E-16
1.00E+06	6.95E+00	1.93E-16
1.50E+06	8.51E+00	1.27E-16
2.00E+06	9.82E+00	1.00E-16
2.50E+06	1.10E+01	8.36E-17
3.00E+06	1.20E+01	6.94E-17

Fig.23 $\text{He}^- + \text{Ne} \rightarrow \text{He} \quad (\sigma_{-10})$

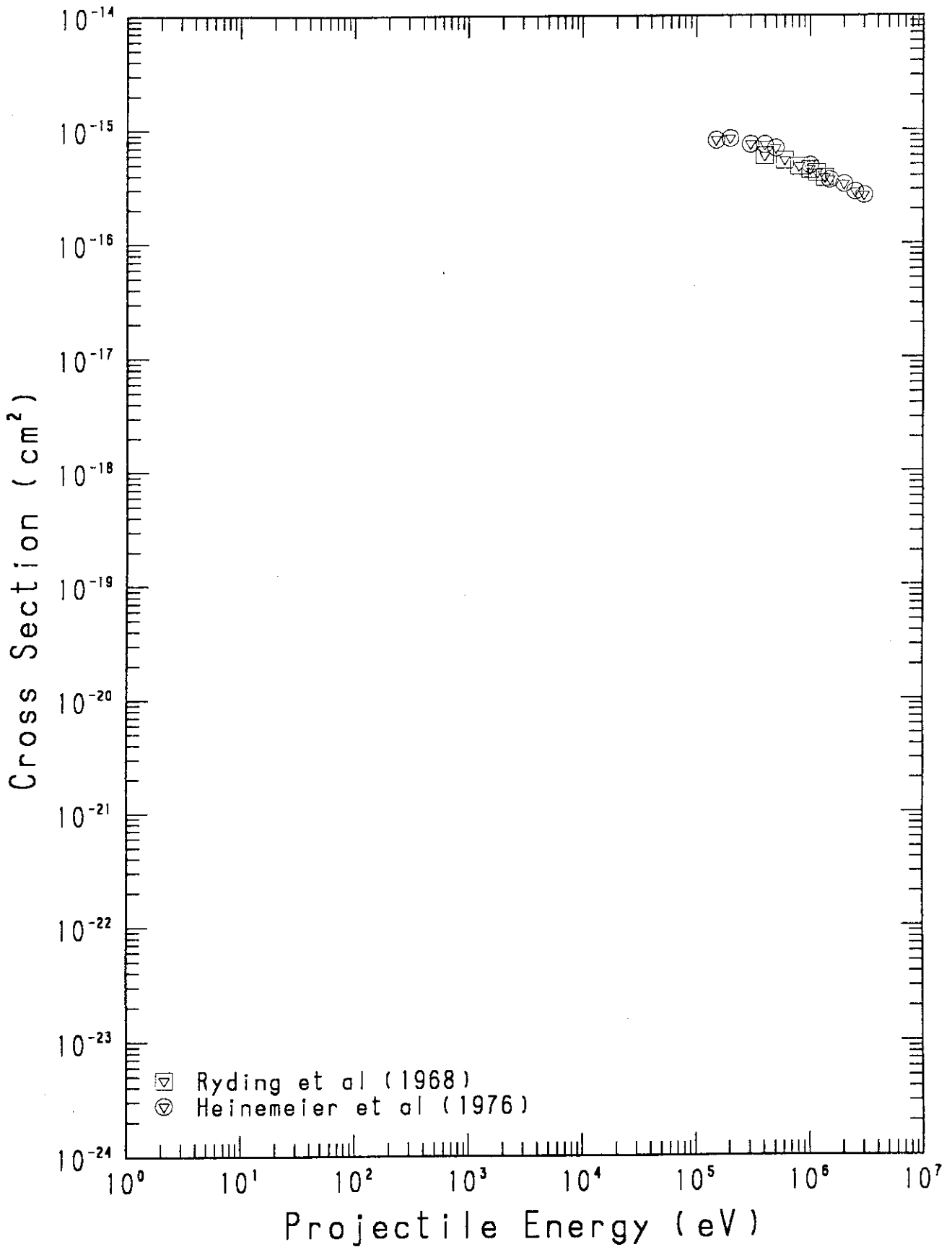


TABLE 23

PROCESS : HE- + NE = HE (-10)
 RYDING ET AL, PHYS. REV. 174 149 (1968)

DATA FROM TABLES

E(EV)	V(10(8)*CM/SEC)	SIGMA(CM(2))
4.00E+05	4.39E+00	5.91E-16
6.00E+05	5.38E+00	5.42E-16
8.00E+05	6.21E+00	4.78E-16
1.00E+06	6.95E+00	4.49E-16
1.15E+06	7.45E+00	4.19E-16
1.35E+06	8.07E+00	3.82E-16

HEINEMEIER ET AL, J. PHYS. B9 2669 (1976)

DATA FROM TABLES

E(EV)	V(10(8)*CM/SEC)	SIGMA(CM(2))
1.50E+05	2.69E+00	8.12E-16
2.00E+05	3.11E+00	8.37E-16
3.00E+05	3.80E+00	7.44E-16
4.00E+05	4.39E+00	7.40E-16
5.00E+05	4.91E+00	6.89E-16
1.00E+06	6.95E+00	4.90E-16
1.50E+06	8.51E+00	3.65E-16
2.00E+06	9.82E+00	3.35E-16
2.50E+06	1.10E+01	2.87E-16
3.00E+06	1.20E+01	2.67E-16

Fig.24 He⁻ + Ar → He (σ₋₁₀)

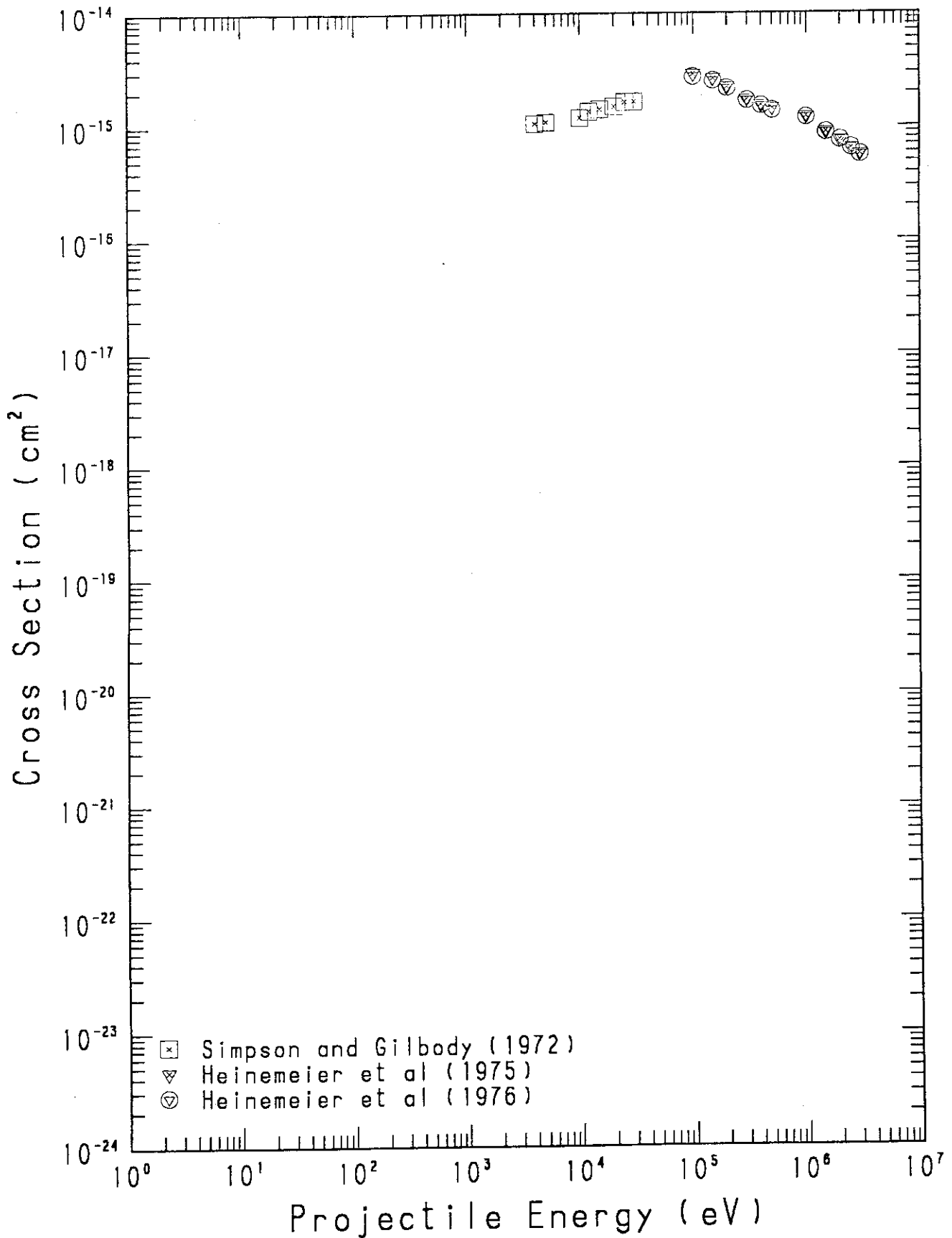


TABLE 24

PROCESS : HE- + AR = HE (-10)
 SIMPSON AND GILBODY, J. PHYS. B5 1959 (1972)

DATA FROM FIGURES

E(EV)	V(10(8)*CM/SEC)	SIGMA(CM(2))
4.00E+03	4.39E-01	1.07E-15
5.00E+03	4.91E-01	1.10E-15
1.00E+04	6.95E-01	1.20E-15
1.20E+04	7.61E-01	1.36E-15
1.50E+04	8.51E-01	1.42E-15
2.00E+04	9.82E-01	1.50E-15
2.50E+04	1.10E+00	1.64E-15
3.00E+04	1.20E+00	1.66E-15

HEINEMEIER ET AL, J. PHYS. B8 1880 (1975)

DATA FROM FIGURES

E(EV)	V(10(8)*CM/SEC)	SIGMA(CM(2))
1.00E+05	2.20E+00	2.90E-15
1.50E+05	2.69E+00	2.64E-15
2.00E+05	3.11E+00	2.22E-15
3.00E+05	3.80E+00	1.73E-15
4.00E+05	4.39E+00	1.54E-15
5.00E+05	4.91E+00	1.44E-15
1.00E+06	6.95E+00	1.22E-15
1.50E+06	8.51E+00	8.92E-16
2.00E+06	9.82E+00	7.56E-16
2.50E+06	1.10E+01	6.40E-16
3.00E+06	1.20E+01	5.71E-16

HEINEMEIER ET AL, J. PHYS. B9 2669 (1976)

DATA FROM TABLES

E(EV)	V(10(8)*CM/SEC)	SIGMA(CM(2))
1.00E+05	2.20E+00	2.75E-15
1.50E+05	2.69E+00	2.54E-15
2.00E+05	3.11E+00	2.18E-15
3.00E+05	3.80E+00	1.70E-15
4.00E+05	4.39E+00	1.52E-15
5.00E+05	4.91E+00	1.38E-15
1.00E+06	6.95E+00	1.20E-15
1.50E+06	8.51E+00	8.87E-16
2.00E+06	9.82E+00	7.58E-16
2.50E+06	1.10E+01	6.49E-16
3.00E+06	1.20E+01	5.64E-16

Fig.25 $\text{He}^- + \text{He} \rightarrow \text{He}^+$ (σ_{-11})

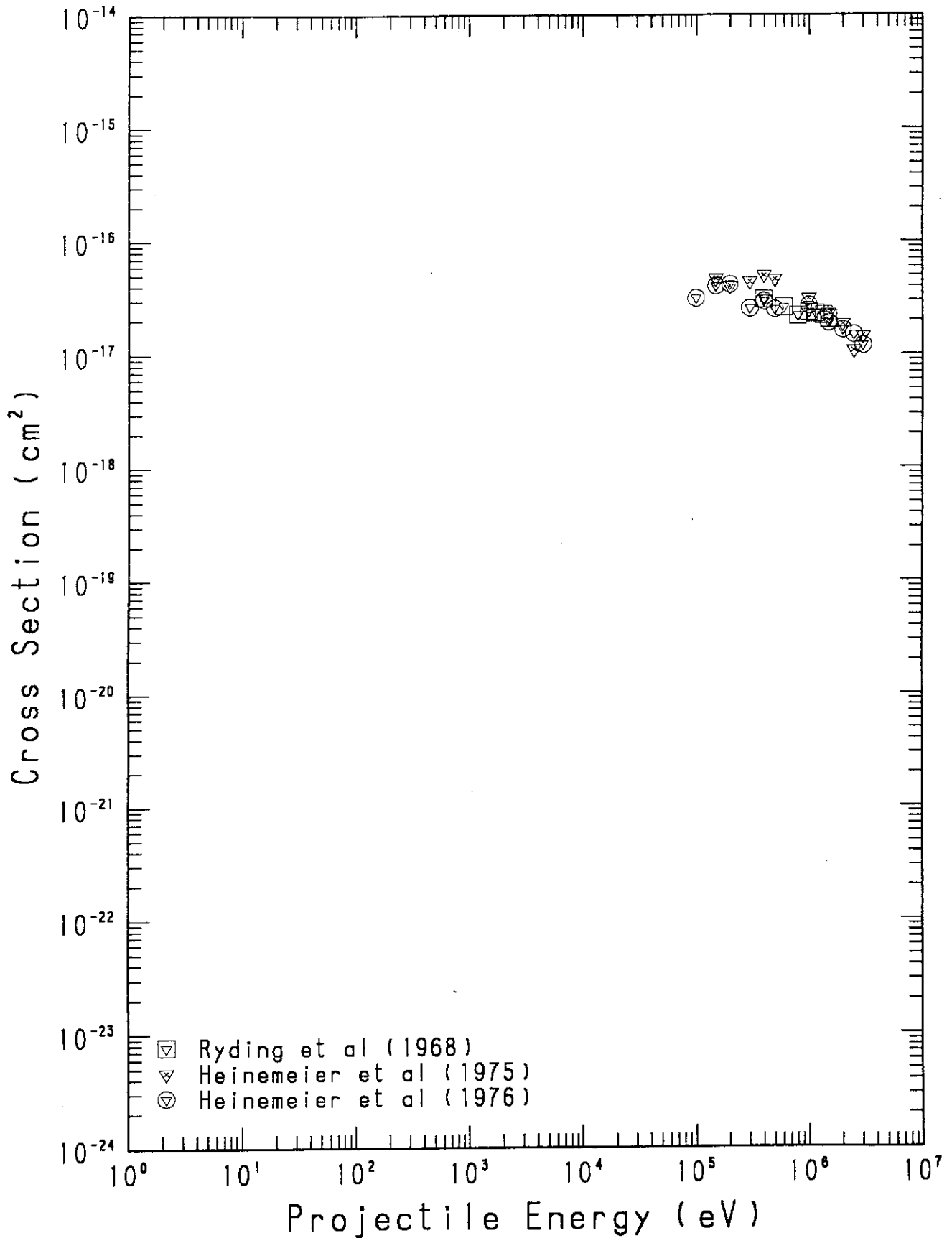


TABLE 25

PROCESS : HE- + HE = HE+ (-11)
 RYDING ET AL, PHYS. REV. 174 149 (1968)

DATA FROM TABLES

E(EV)	V(10(8)*CM/SEC)	SIGMA(CM(2))
4.00E+05	4.39E+00	3.07E-17
6.00E+05	5.38E+00	2.60E-17
8.00E+05	6.21E+00	2.20E-17
1.00E+06	6.95E+00	2.35E-17
1.15E+06	7.45E+00	2.30E-17
1.35E+06	8.07E+00	2.21E-17
1.50E+06	8.51E+00	2.04E-17

HEINEMEIER ET AL, J. PHYS. B8 1880 (1975)

DATA FROM FIGURES

E(EV)	V(10(8)*CM/SEC)	SIGMA(CM(2))
1.50E+05	2.69E+00	4.66E-17
2.00E+05	3.11E+00	3.98E-17
3.00E+05	3.80E+00	4.37E-17
4.00E+05	4.39E+00	4.97E-17
5.00E+05	4.91E+00	4.59E-17
1.00E+06	6.95E+00	3.11E-17
1.50E+06	8.51E+00	2.29E-17
2.00E+06	9.82E+00	1.86E-17
2.50E+06	1.10E+01	1.08E-17
3.00E+06	1.20E+01	1.45E-17

HEINEMEIER ET AL, J. PHYS. B9 2669 (1976)

DATA FROM TABLES

E(EV)	V(10(8)*CM/SEC)	SIGMA(CM(2))
1.00E+05	2.20E+00	3.13E-17
1.50E+05	2.69E+00	4.00E-17
2.00E+05	3.11E+00	4.14E-17
3.00E+05	3.80E+00	2.54E-17
4.00E+05	4.39E+00	2.94E-17
5.00E+05	4.91E+00	2.50E-17
1.00E+06	6.95E+00	2.70E-17
1.50E+06	8.51E+00	1.90E-17
2.00E+06	9.82E+00	1.65E-17
2.50E+06	1.10E+01	1.50E-17
3.00E+06	1.20E+01	1.20E-17

Fig.26 $\text{He}^- + \text{Ne} \rightarrow \text{He}^+ (\sigma_{-11})$

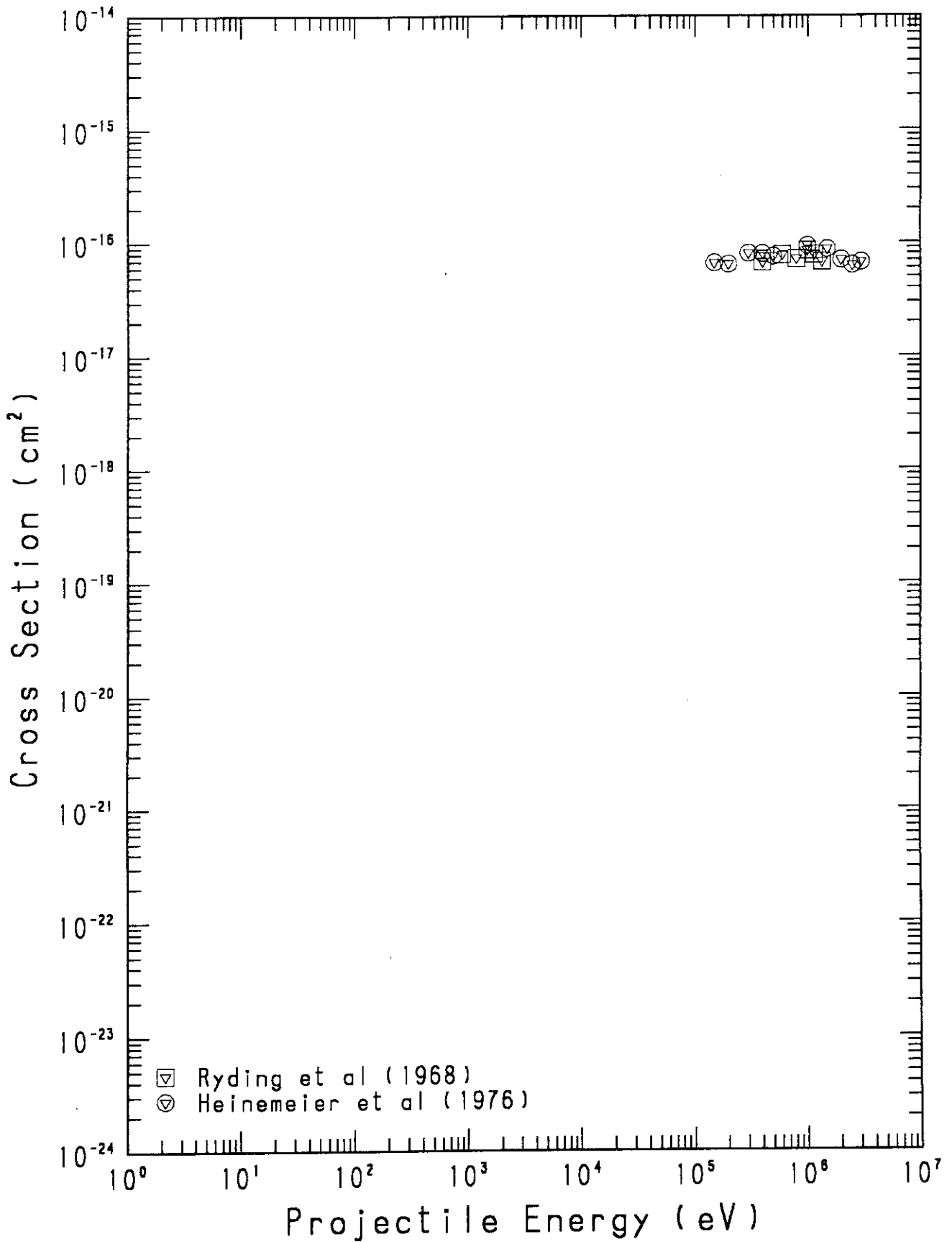


TABLE 26

PROCESS : HE- + NE = HE+ (-11)
 RYDING ET AL, PHYS. REV. 174 149 (1968)

DATA FROM TABLES

E(EV)	V(10(8)*CM/SEC)	SIGMA(CM(2))
4.00E+05	4.39E+00	6.65E-17
6.00E+05	5.38E+00	7.72E-17
8.00E+05	6.21E+00	7.12E-17
1.00E+06	6.95E+00	8.43E-17
1.15E+06	7.45E+00	7.77E-17
1.35E+06	8.07E+00	6.75E-17

HEINEMEIER ET AL, J. PHYS. B9 2669 (1976)

DATA FROM TABLES

E(EV)	V(10(8)*CM/SEC)	SIGMA(CM(2))
1.50E+05	2.69E+00	6.59E-17
2.00E+05	3.11E+00	6.40E-17
3.00E+05	3.80E+00	7.95E-17
4.00E+05	4.39E+00	7.90E-17
5.00E+05	4.91E+00	7.48E-17
1.00E+06	6.95E+00	9.30E-17
1.50E+06	8.51E+00	8.70E-17
2.00E+06	9.82E+00	7.00E-17
2.50E+06	1.10E+01	6.30E-17
3.00E+06	1.20E+01	6.70E-17

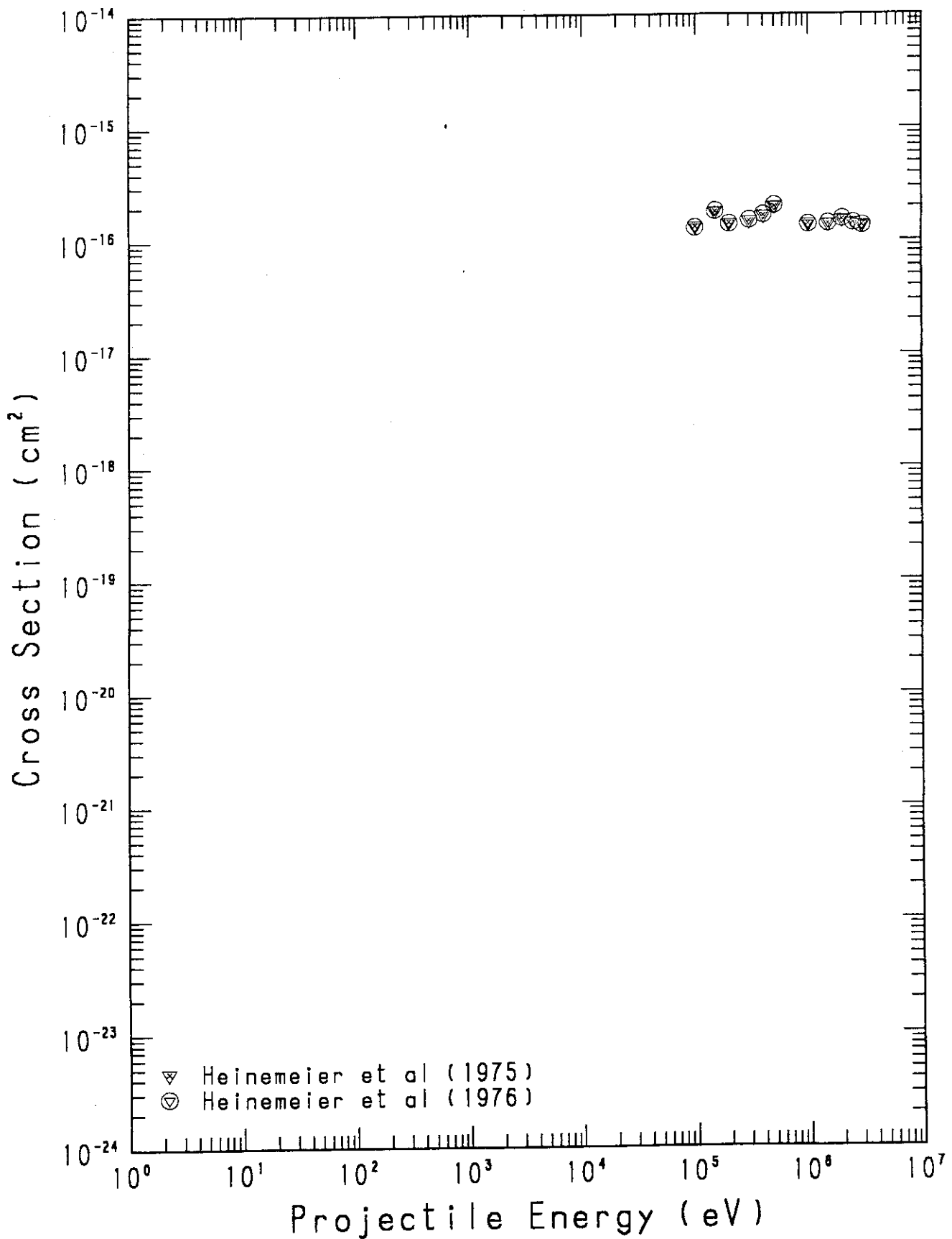
Fig.27 $\text{He}^- + \text{Ar} \rightarrow \text{He}^+$ (σ_{-11})

TABLE 27

PROCESS : HE- + AR = HE+ (-11)
 HEINEMEIER ET AL, J. PHYS. B8 1880 (1975)

DATA FROM FIGURES

E(EV)	V(10(8)*CM/SEC)	SIGMA(CM(2))
1.00E+05	2.20E+00	1.32E-16
1.50E+05	2.69E+00	1.79E-16
2.00E+05	3.11E+00	1.41E-16
3.00E+05	3.80E+00	1.48E-16
4.00E+05	4.39E+00	1.65E-16
5.00E+05	4.91E+00	1.98E-16
1.00E+06	6.95E+00	1.39E-16
1.50E+06	8.51E+00	1.39E-16
2.00E+06	9.82E+00	1.52E-16
2.50E+06	1.10E+01	1.42E-16
3.00E+06	1.20E+01	1.35E-16

HEINEMEIER ET AL, J. PHYS. B9 2669 (1976)

DATA FROM TABLES

E(EV)	V(10(8)*CM/SEC)	SIGMA(CM(2))
1.00E+05	2.20E+00	1.30E-16
1.50E+05	2.69E+00	1.82E-16
2.00E+05	3.11E+00	1.40E-16
3.00E+05	3.80E+00	1.51E-16
4.00E+05	4.39E+00	1.68E-16
5.00E+05	4.91E+00	2.03E-16
1.00E+06	6.95E+00	1.38E-16
1.50E+06	8.51E+00	1.41E-16
2.00E+06	9.82E+00	1.54E-16
2.50E+06	1.10E+01	1.42E-16
3.00E+06	1.20E+01	1.35E-16

Fig.28 He + He → He⁺ (σ₀₁)

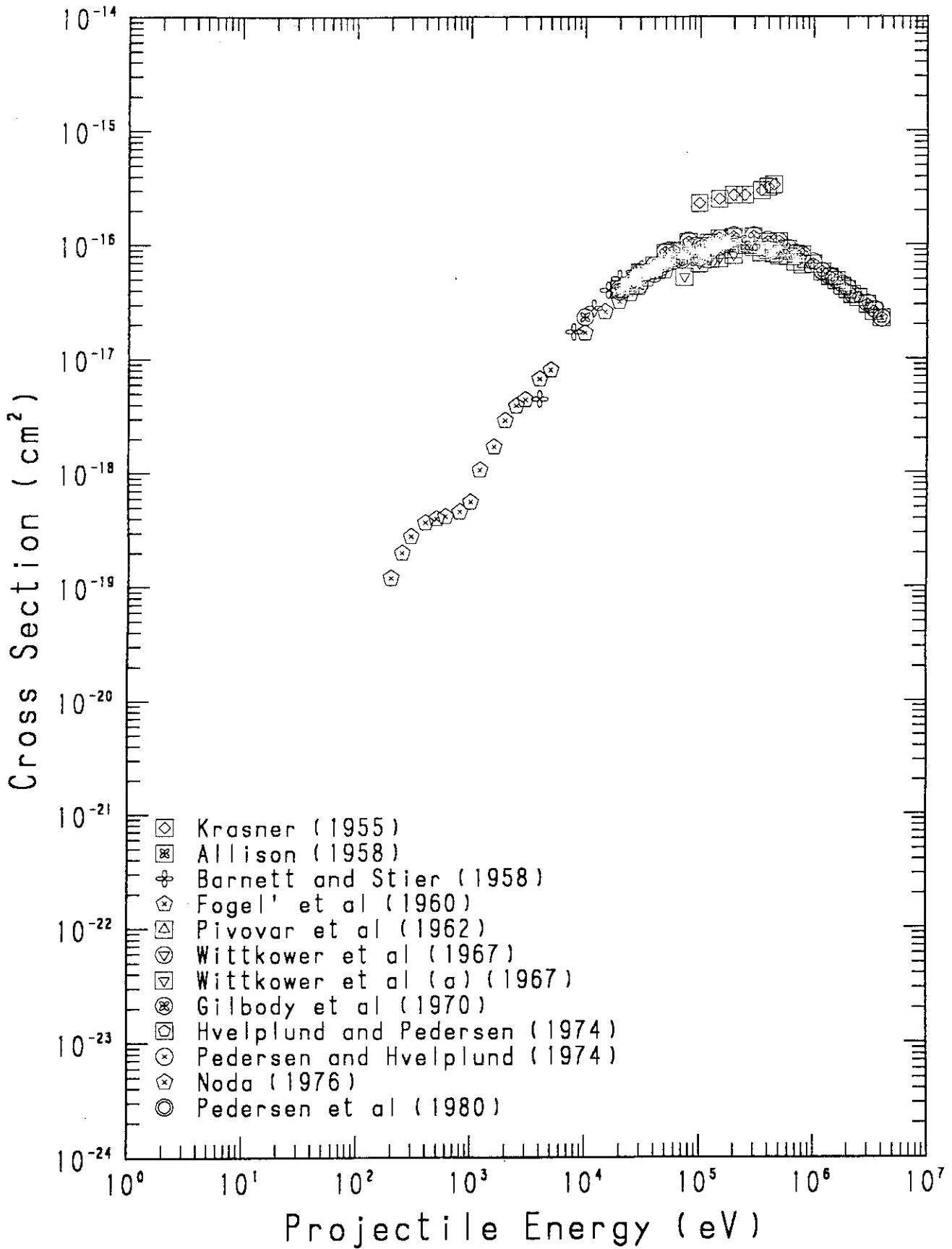


TABLE 28

PROCESS : HE + HE = HE+ (01)
 KRASNER, PHYS. REV. 99 520 (1955)

DATA FROM TABLES

E(EV)	V(10(8)*CM/SEC)	SIGMA(CM(2))
1.00E+05	2.20E+00	2.32E-16
1.50E+05	2.69E+00	2.52E-16
2.00E+05	3.11E+00	2.72E-16
2.50E+05	3.47E+00	2.72E-16
3.50E+05	4.11E+00	2.98E-16
4.00E+05	4.39E+00	3.20E-16
4.50E+05	4.66E+00	3.36E-16

ALLISON, PHYS. REV. 109 76 (1958)

DATA FROM TABLES

E(EV)	V(10(8)*CM/SEC)	SIGMA(CM(2))
1.50E+05	2.69E+00	8.90E-17
2.50E+05	3.47E+00	9.70E-17
3.50E+05	4.11E+00	8.40E-17
4.50E+05	4.66E+00	8.20E-17

BARNETT AND STIER, PHYS. REV. 109 385 (1958)

DATA FROM FIGURES

E(EV)	V(10(8)*CM/SEC)	SIGMA(CM(2))
4.00E+03	4.39E-01	4.48E-18
8.00E+03	6.21E-01	1.73E-17
1.20E+04	7.61E-01	2.78E-17
1.60E+04	8.79E-01	3.98E-17
2.00E+04	9.82E-01	5.03E-17
2.40E+04	1.08E+00	4.83E-17
2.70E+04	1.14E+00	5.71E-17
2.90E+04	1.18E+00	5.77E-17
3.10E+04	1.22E+00	6.06E-17
4.00E+04	1.39E+00	6.29E-17
5.00E+04	1.55E+00	6.80E-17
6.00E+04	1.70E+00	7.11E-17
7.00E+04	1.84E+00	7.62E-17
8.00E+04	1.96E+00	7.89E-17
1.00E+05	2.20E+00	8.34E-17
1.20E+05	2.41E+00	8.94E-17
1.40E+05	2.60E+00	9.28E-17
1.60E+05	2.78E+00	9.63E-17
1.80E+05	2.95E+00	9.75E-17
2.00E+05	3.11E+00	1.02E-16

TABLE 28 -CONTINUED

FOGEL' ET AL, SOV. PHYS. JETP 11 18 (1960)

DATA FROM FIGURES

E(EV)	V(10(8)*CM/SEC)	SIGMA(CM(2))
1.00E+04	6.95E-01	1.70E-17
1.50E+04	8.51E-01	2.59E-17
2.00E+04	9.82E-01	3.18E-17
2.50E+04	1.10E+00	3.68E-17
3.00E+04	1.20E+00	4.20E-17
3.50E+04	1.30E+00	4.97E-17
4.00E+04	1.39E+00	5.79E-17
4.50E+04	1.47E+00	5.81E-17
5.00E+04	1.55E+00	5.86E-17

PIVOVAR ET AL, SOV. PHYS. JETP 14 20 (1962)

DATA FROM FIGURES

E(EV)	V(10(8)*CM/SEC)	SIGMA(CM(2))
2.00E+05	3.11E+00	8.96E-17
3.00E+05	3.80E+00	9.38E-17
4.00E+05	4.39E+00	8.80E-17
5.00E+05	4.91E+00	7.88E-17
6.00E+05	5.38E+00	7.75E-17
7.00E+05	5.81E+00	6.94E-17
8.00E+05	6.21E+00	6.61E-17

WITTKOWER ET AL, PROC. PHYS. SOC. 90 581 (1967)

DATA FROM TABLES

E(EV)	V(10(8)*CM/SEC)	SIGMA(CM(2))
1.20E+05	2.41E+00	7.30E-17

WITTKOWER ET AL (A), PROC. PHYS. SOC. 91 862 (1967)

DATA FROM FIGURES

E(EV)	V(10(8)*CM/SEC)	SIGMA(CM(2))
7.40E+04	1.89E+00	5.19E-17
1.00E+05	2.20E+00	6.76E-17
1.25E+05	2.46E+00	7.42E-17
1.50E+05	2.69E+00	7.51E-17
2.00E+05	3.11E+00	7.98E-17

TABLE 28 -CONTINUED

GILBODY ET AL, J. PHYS. B3 1105 (1970)

DATA FROM FIGURES

E(EV)	V(10(8)*CM/SEC)	SIGMA(CM(2))
1.00E+04	6.95E-01	2.32E-17
2.00E+04	9.82E-01	3.86E-17
3.00E+04	1.20E+00	4.41E-17
4.00E+04	1.39E+00	5.49E-17

HVELPLUND AND PEDERSEN, PHYS. REV. A9 2434 (1974)

DATA FROM FIGURES

E(EV)	V(10(8)*CM/SEC)	SIGMA(CM(2))
2.00E+04	9.82E-01	4.06E-17
2.50E+04	1.10E+00	4.34E-17
3.00E+04	1.20E+00	5.66E-17
4.00E+04	1.39E+00	6.58E-17
5.00E+04	1.55E+00	8.45E-17
6.00E+04	1.70E+00	8.80E-17
8.00E+04	1.96E+00	1.05E-16
1.00E+05	2.20E+00	9.66E-17
1.20E+05	2.41E+00	1.03E-16
1.50E+05	2.69E+00	1.13E-16
2.00E+05	3.11E+00	1.16E-16
3.00E+05	3.80E+00	1.17E-16
4.00E+05	4.39E+00	1.05E-16
5.00E+05	4.91E+00	1.06E-16
6.00E+05	5.38E+00	9.07E-17
7.00E+05	5.81E+00	8.21E-17
8.00E+05	6.21E+00	8.08E-17
1.00E+06	6.95E+00	6.72E-17
1.20E+06	7.61E+00	5.74E-17
1.40E+06	8.22E+00	5.20E-17
1.60E+06	8.79E+00	4.83E-17
1.80E+06	9.32E+00	4.31E-17
2.00E+06	9.82E+00	4.02E-17
2.20E+06	1.03E+01	3.63E-17
2.50E+06	1.10E+01	3.43E-17
3.00E+06	1.20E+01	2.98E-17
3.40E+06	1.28E+01	2.58E-17
4.00E+06	1.39E+01	2.27E-17

TABLE 28 -CONTINUED

PEDERSEN AND HVELPLUND, J. PHYS. B7 132 (1974)

DATA FROM TABLES

E(EV)	V(10(8)*CM/SEC)	SIGMA(CM(2))
2.00E+04	9.82E-01	4.08E-17
2.50E+04	1.10E+00	4.41E-17
3.00E+04	1.20E+00	5.62E-17
4.00E+04	1.39E+00	6.55E-17
5.00E+04	1.55E+00	8.63E-17
6.00E+04	1.70E+00	8.70E-17
8.00E+04	1.96E+00	1.08E-16
1.00E+05	2.20E+00	9.50E-17
1.20E+05	2.41E+00	1.03E-16
1.50E+05	2.69E+00	1.13E-16
2.00E+05	3.11E+00	1.20E-16
3.00E+05	3.80E+00	1.20E-16
4.00E+05	4.39E+00	1.09E-16
5.00E+05	4.91E+00	1.06E-16
6.00E+05	5.38E+00	9.25E-17
7.00E+05	5.81E+00	8.40E-17
8.00E+05	6.21E+00	8.00E-17
1.00E+06	6.95E+00	7.04E-17
1.20E+06	7.61E+00	5.80E-17
1.40E+06	8.22E+00	5.25E-17
1.50E+06	8.51E+00	5.12E-17
1.60E+06	8.79E+00	4.88E-17
1.80E+06	9.32E+00	4.50E-17
2.00E+06	9.82E+00	4.21E-17
2.25E+06	1.04E+01	3.61E-17
3.00E+06	1.20E+01	3.07E-17
3.50E+06	1.30E+01	2.68E-17
4.00E+06	1.39E+01	2.26E-17

NODA, J. PHYS. SOC. JPN 41 625 (1976)

DATA FROM FIGURES

E(EV)	V(10(8)*CM/SEC)	SIGMA(CM(2))
2.00E+02	9.82E-02	1.20E-19
2.50E+02	1.10E-01	2.00E-19
3.00E+02	1.20E-01	2.80E-19
4.00E+02	1.39E-01	3.70E-19
5.00E+02	1.55E-01	4.00E-19

TABLE 28 -CONTINUED

6.00E+02	1.70E-01	4.20E-19
8.00E+02	1.96E-01	4.60E-19
1.00E+03	2.20E-01	5.60E-19
1.20E+03	2.41E-01	1.06E-18
1.60E+03	2.78E-01	1.70E-18
2.00E+03	3.11E-01	2.90E-18
2.50E+03	3.47E-01	3.90E-18
3.00E+03	3.80E-01	4.40E-18
4.00E+03	4.39E-01	6.70E-18
5.00E+03	4.91E-01	8.00E-18

PEDERSEN ET AL, J. PHYS. B13 1167 (1980)

DATA FROM TABLES

E(EV)	V(10(8)*CM/SEC)	SIGMA(CM(2))
2.50E+04	1.10E+00	4.60E-17
3.00E+04	1.20E+00	5.20E-17
3.50E+04	1.30E+00	5.75E-17
4.00E+04	1.39E+00	5.85E-17
4.50E+04	1.47E+00	6.25E-17
5.00E+04	1.55E+00	6.75E-17
6.00E+04	1.70E+00	7.20E-17
7.00E+04	1.84E+00	7.30E-17
9.00E+04	2.08E+00	7.70E-17
1.00E+05	2.20E+00	7.60E-17
1.30E+05	2.50E+00	9.25E-17
1.60E+05	2.78E+00	9.80E-17
2.00E+05	3.11E+00	1.00E-16
2.50E+05	3.47E+00	1.00E-16
3.00E+05	3.80E+00	9.70E-17
4.00E+05	4.39E+00	9.00E-17
4.50E+05	4.66E+00	8.65E-17

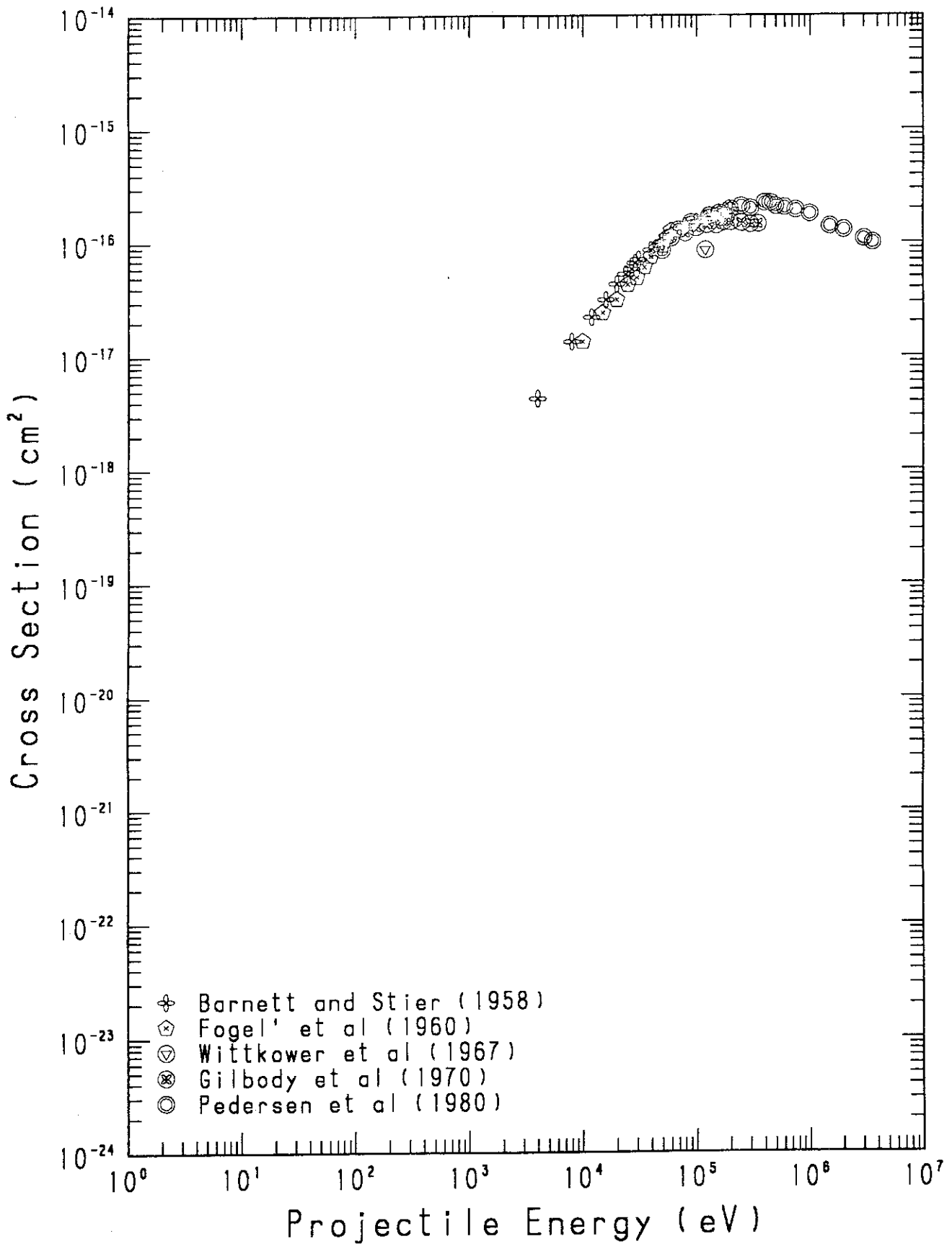
Fig.29 He + Ne \rightarrow He⁺ (σ_{01})

TABLE 29

PROCESS : HE + NE = HE+ (01)
 BARNETT AND STIER, PHYS. REV. 109 385 (1958)

DATA FROM FIGURES

E(EV)	V(10(8)*CM/SEC)	SIGMA(CM(2))
4.00E+03	4.39E-01	4.28E-18
8.00E+03	6.21E-01	1.35E-17
1.20E+04	7.61E-01	2.21E-17
1.60E+04	8.79E-01	3.13E-17
2.00E+04	9.82E-01	4.30E-17
2.40E+04	1.08E+00	5.25E-17
2.70E+04	1.14E+00	5.80E-17
2.90E+04	1.18E+00	6.57E-17
3.10E+04	1.22E+00	7.03E-17
4.00E+04	1.39E+00	8.52E-17
5.00E+04	1.55E+00	1.01E-16
6.00E+04	1.70E+00	1.15E-16
7.00E+04	1.84E+00	1.30E-16
8.00E+04	1.96E+00	1.38E-16
1.00E+05	2.20E+00	1.51E-16
1.20E+05	2.41E+00	1.62E-16
1.40E+05	2.60E+00	1.73E-16
1.60E+05	2.78E+00	1.80E-16
1.80E+05	2.95E+00	1.88E-16
2.00E+05	3.11E+00	1.94E-16

FOGEL' ET AL, SOV. PHYS. JETP 11 18 (1960)

DATA FROM FIGURES

E(EV)	V(10(8)*CM/SEC)	SIGMA(CM(2))
1.00E+04	6.95E-01	1.35E-17
1.50E+04	8.51E-01	2.41E-17
2.00E+04	9.82E-01	3.13E-17
2.50E+04	1.10E+00	4.24E-17
3.00E+04	1.20E+00	4.88E-17
3.50E+04	1.30E+00	6.05E-17
4.00E+04	1.39E+00	7.47E-17
4.50E+04	1.47E+00	8.69E-17
5.00E+04	1.55E+00	9.35E-17
5.50E+04	1.63E+00	1.10E-16
6.00E+04	1.70E+00	1.27E-16

WITTKOWER ET AL, PROC. PHYS. SOC. 90 581 (1967)

DATA FROM TABLES

E(EV)	V(10(8)*CM/SEC)	SIGMA(CM(2))
1.20E+05	2.41E+00	8.56E-17

TABLE 29 -CONTINUED

GILBODY ET AL, J. PHYS. B3 1105 (1970)

DATA FROM FIGURES

E(EV)	V(10(8)*CM/SEC)	SIGMA(CM(2))
6.00E+04	1.70E+00	1.09E-16
8.00E+04	1.96E+00	1.21E-16
1.00E+05	2.20E+00	1.34E-16
1.25E+05	2.46E+00	1.43E-16
1.50E+05	2.69E+00	1.42E-16
1.75E+05	2.91E+00	1.52E-16
2.00E+05	3.11E+00	1.51E-16
2.50E+05	3.47E+00	1.49E-16
3.00E+05	3.80E+00	1.45E-16
3.50E+05	4.11E+00	1.46E-16

PEDERSEN ET AL, J. PHYS. B13 1167 (1980)

DATA FROM TABLES

E(EV)	V(10(8)*CM/SEC)	SIGMA(CM(2))
5.00E+04	1.55E+00	8.50E-17
6.00E+04	1.70E+00	1.10E-16
7.00E+04	1.84E+00	1.30E-16
9.00E+04	2.08E+00	1.50E-16
1.30E+05	2.50E+00	1.72E-16
1.60E+05	2.78E+00	1.82E-16
2.00E+05	3.11E+00	1.98E-16
2.50E+05	3.47E+00	2.10E-16
3.00E+05	3.80E+00	2.01E-16
4.00E+05	4.39E+00	2.25E-16
4.50E+05	4.66E+00	2.24E-16
5.00E+05	4.91E+00	2.10E-16
6.00E+05	5.38E+00	2.05E-16
7.50E+05	6.01E+00	1.95E-16
1.00E+06	6.95E+00	1.80E-16
1.50E+06	8.51E+00	1.40E-16
2.00E+06	9.82E+00	1.30E-16
3.00E+06	1.20E+01	1.08E-16
3.60E+06	1.32E+01	1.00E-16

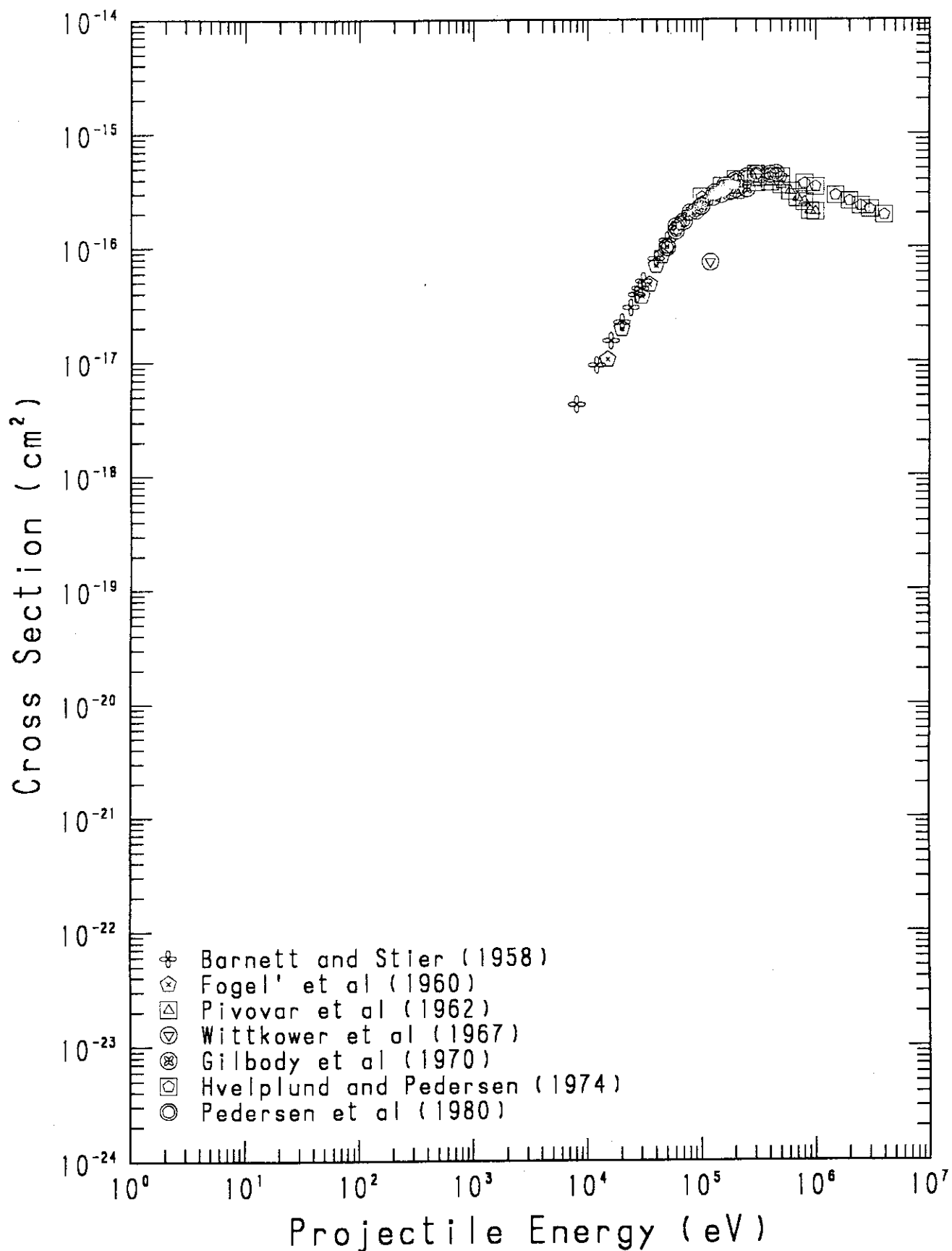
Fig.30 He + Ar \rightarrow He⁺ (σ_{01})

TABLE 30

PROCESS : HE + AR = HE+ (01)
 BARNETT AND STIER, PHYS. REV. 109 385 (1958)

DATA FROM FIGURES

E(EV)	V(10(8)*CM/SEC)	SIGMA(CM(2))
8.00E+03	6.21E-01	4.25E-18
1.20E+04	7.61E-01	9.35E-18
1.60E+04	8.79E-01	1.53E-17
2.00E+04	9.82E-01	2.22E-17
2.40E+04	1.08E+00	2.98E-17
2.70E+04	1.14E+00	3.85E-17
2.90E+04	1.18E+00	4.37E-17
3.10E+04	1.22E+00	5.07E-17
4.00E+04	1.39E+00	7.96E-17
5.00E+04	1.55E+00	1.15E-16
6.00E+04	1.70E+00	1.50E-16
7.00E+04	1.84E+00	1.79E-16
8.00E+04	1.96E+00	2.04E-16
1.00E+05	2.20E+00	2.40E-16
1.20E+05	2.41E+00	2.77E-16
1.40E+05	2.60E+00	3.00E-16
1.60E+05	2.78E+00	3.30E-16
1.80E+05	2.95E+00	3.54E-16
2.00E+05	3.11E+00	3.77E-16

FOGEL' ET AL, SOV. PHYS. JETP 11 18 (1960)

DATA FROM FIGURES

E(EV)	V(10(8)*CM/SEC)	SIGMA(CM(2))
1.50E+04	8.51E-01	1.05E-17
2.00E+04	9.82E-01	1.95E-17
3.00E+04	1.20E+00	3.73E-17
3.50E+04	1.30E+00	4.74E-17
4.00E+04	1.39E+00	6.92E-17
4.50E+04	1.47E+00	8.36E-17
5.00E+04	1.55E+00	1.02E-16

PIVOVAR ET AL, SOV. PHYS. JETP 14 20 (1962)

DATA FROM FIGURES

E(EV)	V(10(8)*CM/SEC)	SIGMA(CM(2))
2.00E+05	3.11E+00	3.18E-16
3.00E+05	3.80E+00	3.71E-16

TABLE 30 -CONTINUED

4.00E+05	4.39E+00	3.77E-16
5.00E+05	4.91E+00	3.54E-16
6.00E+05	5.38E+00	3.13E-16
7.00E+05	5.81E+00	2.72E-16
8.00E+05	6.21E+00	2.52E-16
9.00E+05	6.59E+00	2.09E-16
1.00E+06	6.95E+00	2.06E-16

WITTKOWER ET AL, PROC. PHYS. SOC. 90 581 (1967)

DATA FROM TABLES

E(EV)	V(10(8)*CM/SEC)	SIGMA(CM(2))
1.20E+05	2.41E+00	7.40E-17

GILBODY ET AL, J. PHYS. B3 1105 (1970)

DATA FROM FIGURES

E(EV)	V(10(8)*CM/SEC)	SIGMA(CM(2))
6.00E+04	1.70E+00	1.54E-16
8.00E+04	1.96E+00	2.05E-16
1.00E+05	2.20E+00	2.33E-16
1.25E+05	2.46E+00	2.77E-16
1.50E+05	2.69E+00	2.95E-16
1.75E+05	2.91E+00	3.08E-16
2.00E+05	3.11E+00	3.27E-16
2.50E+05	3.47E+00	3.28E-16

HVELPLUND AND PEDERSEN, PHYS. REV. A9 2434 (1974)

DATA FROM FIGURES

E(EV)	V(10(8)*CM/SEC)	SIGMA(CM(2))
1.00E+05	2.20E+00	2.80E-16
1.50E+05	2.69E+00	3.47E-16
2.00E+05	3.11E+00	3.99E-16
3.00E+05	3.80E+00	4.39E-16
4.00E+05	4.39E+00	4.16E-16
5.00E+05	4.91E+00	4.16E-16
8.00E+05	6.21E+00	3.66E-16
1.00E+06	6.95E+00	3.43E-16
1.50E+06	8.51E+00	2.89E-16
2.00E+06	9.82E+00	2.57E-16
2.50E+06	1.10E+01	2.34E-16
3.00E+06	1.20E+01	2.17E-16
4.00E+06	1.39E+01	1.93E-16

TABLE 30 -CONTINUED

PEDERSEN ET AL, J. PHYS. B13 1167 (1980)

DATA FROM TABLES

E(EV)	V(10(8)*CM/SEC)	SIGMA(CM(2))
5.00E+04	1.55E+00	1.00E-16
6.00E+04	1.70E+00	1.40E-16
7.00E+04	1.84E+00	1.70E-16
9.00E+04	2.08E+00	2.10E-16
1.00E+05	2.20E+00	2.30E-16
1.30E+05	2.50E+00	3.05E-16
1.60E+05	2.78E+00	3.50E-16
2.00E+05	3.11E+00	3.90E-16
2.50E+05	3.47E+00	4.20E-16
3.00E+05	3.80E+00	4.45E-16
4.00E+05	4.39E+00	4.40E-16
4.50E+05	4.66E+00	4.48E-16

Fig.31 He + Kr → He⁺ (σ₀₁)

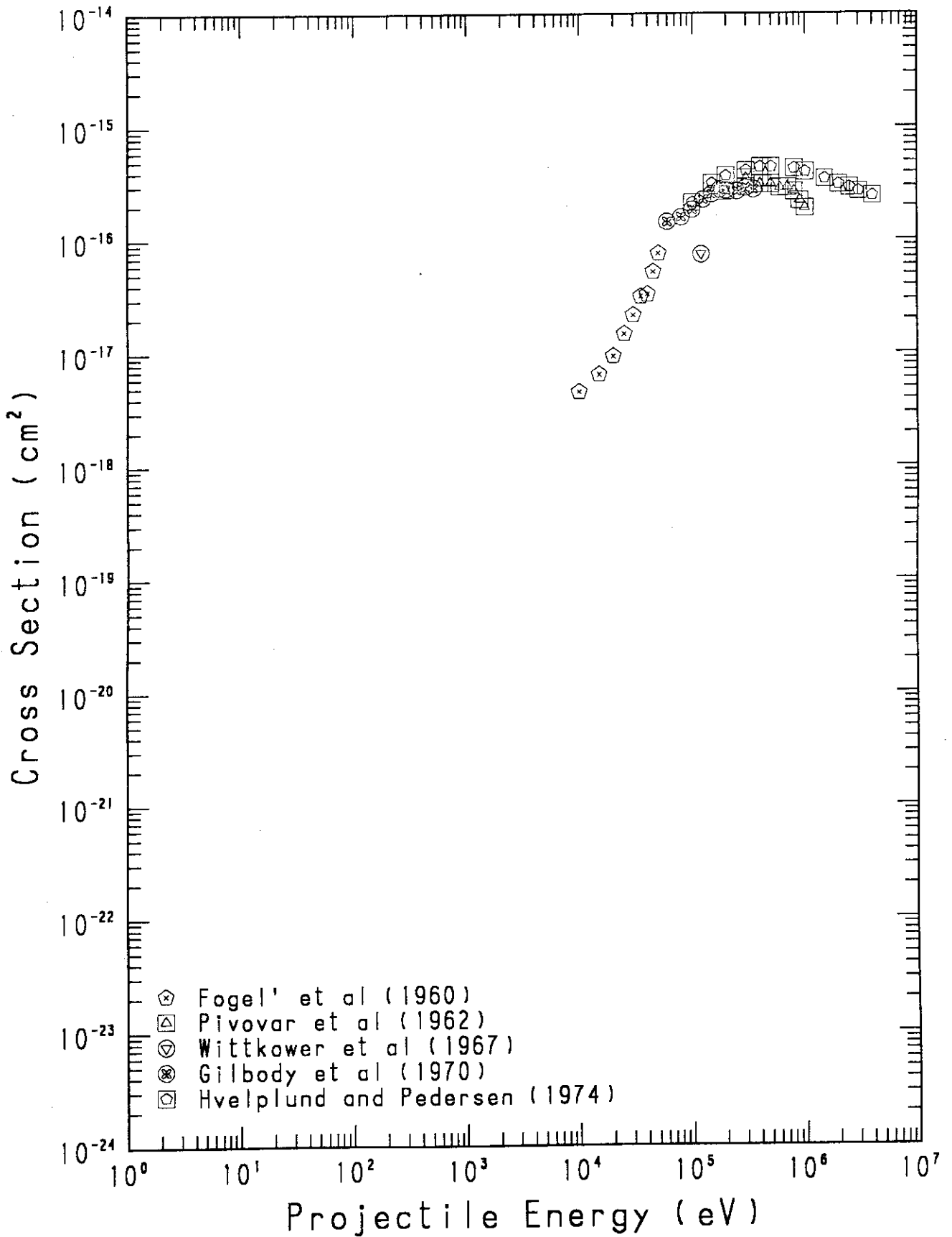


TABLE 31

PROCESS : HE + KR = HE+ (01)
 FOGEL' ET AL, SOV. PHYS. JETP 11 18 (1960)

DATA FROM FIGURES

E(EV)	V(10(8)*CM/SEC)	SIGMA(CM(2))
1.00E+04	6.95E-01	4.59E-18
1.50E+04	8.51E-01	6.49E-18
2.00E+04	9.82E-01	9.39E-18
2.50E+04	1.10E+00	1.48E-17
3.00E+04	1.20E+00	2.16E-17
3.50E+04	1.30E+00	3.15E-17
4.00E+04	1.39E+00	3.29E-17
4.50E+04	1.47E+00	5.20E-17
5.00E+04	1.55E+00	7.53E-17

PIVOVAR ET AL, SOV. PHYS. JETP 14 20 (1962)

DATA FROM FIGURES

E(EV)	V(10(8)*CM/SEC)	SIGMA(CM(2))
2.00E+05	3.11E+00	2.67E-16
3.00E+05	3.80E+00	3.51E-16
4.00E+05	4.39E+00	3.10E-16
5.00E+05	4.91E+00	3.10E-16
6.00E+05	5.38E+00	2.87E-16
7.00E+05	5.81E+00	2.91E-16
8.00E+05	6.21E+00	2.66E-16
9.00E+05	6.59E+00	2.21E-16
1.00E+06	6.95E+00	1.90E-16

WITTKOWER ET AL, PROC. PHYS. SOC. 90 581 (1967)

DATA FROM TABLES

E(EV)	V(10(8)*CM/SEC)	SIGMA(CM(2))
1.20E+05	2.41E+00	7.37E-17

TABLE 31 -CONTINUED

GILBODY ET AL, J. PHYS. B3 1105 (1970)

DATA FROM FIGURES

E(EV)	V(10(8)*CM/SEC)	SIGMA(CM(2))
6.00E+04	1.70E+00	1.44E-16
8.00E+04	1.96E+00	1.58E-16
1.00E+05	2.20E+00	1.84E-16
1.25E+05	2.46E+00	2.26E-16
1.50E+05	2.69E+00	2.52E-16
1.75E+05	2.91E+00	2.76E-16
2.00E+05	3.11E+00	2.71E-16
2.50E+05	3.47E+00	2.68E-16
3.00E+05	3.80E+00	2.86E-16
3.50E+05	4.11E+00	2.77E-16

HVELPLUND AND PEDERSEN, PHYS. REV. A9 2434 (1974)

DATA FROM FIGURES

E(EV)	V(10(8)*CM/SEC)	SIGMA(CM(2))
1.00E+05	2.20E+00	2.14E-16
1.50E+05	2.69E+00	3.15E-16
2.00E+05	3.11E+00	3.66E-16
3.00E+05	3.80E+00	4.07E-16
4.00E+05	4.39E+00	4.39E-16
5.00E+05	4.91E+00	4.40E-16
8.00E+05	6.21E+00	4.27E-16
1.00E+06	6.95E+00	3.97E-16
1.50E+06	8.51E+00	3.46E-16
2.00E+06	9.82E+00	3.09E-16
2.50E+06	1.10E+01	2.90E-16
3.00E+06	1.20E+01	2.69E-16
4.00E+06	1.39E+01	2.45E-16

Fig.32 He + Xe → He⁺ (σ₀₁)

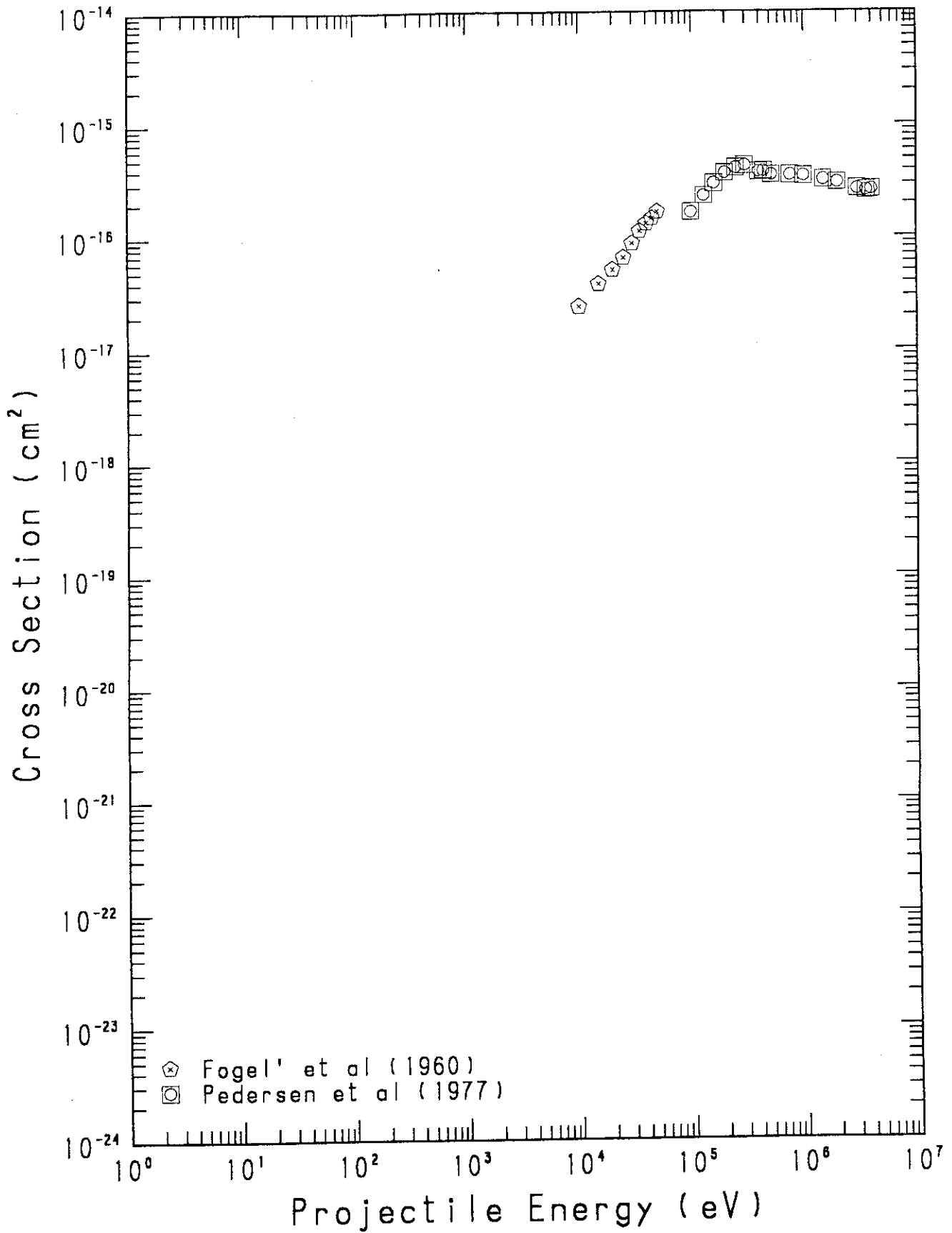


TABLE 32

PROCESS : HE + XE = HE+ (01)
 FOGEL' ET AL, SOV. PHYS. JETP 11 18 (1960)

DATA FROM FIGURES

E(EV)	V(10(8)*CM/SEC)	SIGMA(CM(2))
1.00E+04	6.95E-01	2.44E-17
1.50E+04	8.51E-01	3.86E-17
2.00E+04	9.82E-01	5.14E-17
2.50E+04	1.10E+00	6.56E-17
3.00E+04	1.20E+00	8.78E-17
3.50E+04	1.30E+00	1.13E-16
4.00E+04	1.39E+00	1.31E-16
4.50E+04	1.47E+00	1.47E-16
5.00E+04	1.55E+00	1.68E-16

PEDERSEN ET AL, J. PHYS. B10 L669 (1977)

DATA FROM FIGURES

E(EV)	V(10(8)*CM/SEC)	SIGMA(CM(2))
1.00E+05	2.20E+00	1.67E-16
1.30E+05	2.50E+00	2.35E-16
1.60E+05	2.78E+00	3.02E-16
2.00E+05	3.11E+00	3.72E-16
2.50E+05	3.47E+00	4.12E-16
3.00E+05	3.80E+00	4.33E-16
4.00E+05	4.39E+00	3.81E-16
4.40E+05	4.61E+00	3.84E-16
5.20E+05	5.01E+00	3.56E-16
7.60E+05	6.05E+00	3.54E-16
1.00E+06	6.95E+00	3.49E-16
1.50E+06	8.51E+00	3.23E-16
2.00E+06	9.82E+00	3.05E-16
3.00E+06	1.20E+01	2.67E-16
3.60E+06	1.32E+01	2.58E-16
4.00E+06	1.39E+01	2.63E-16

Fig.33 He + He → He²⁺ (σ₀₂)

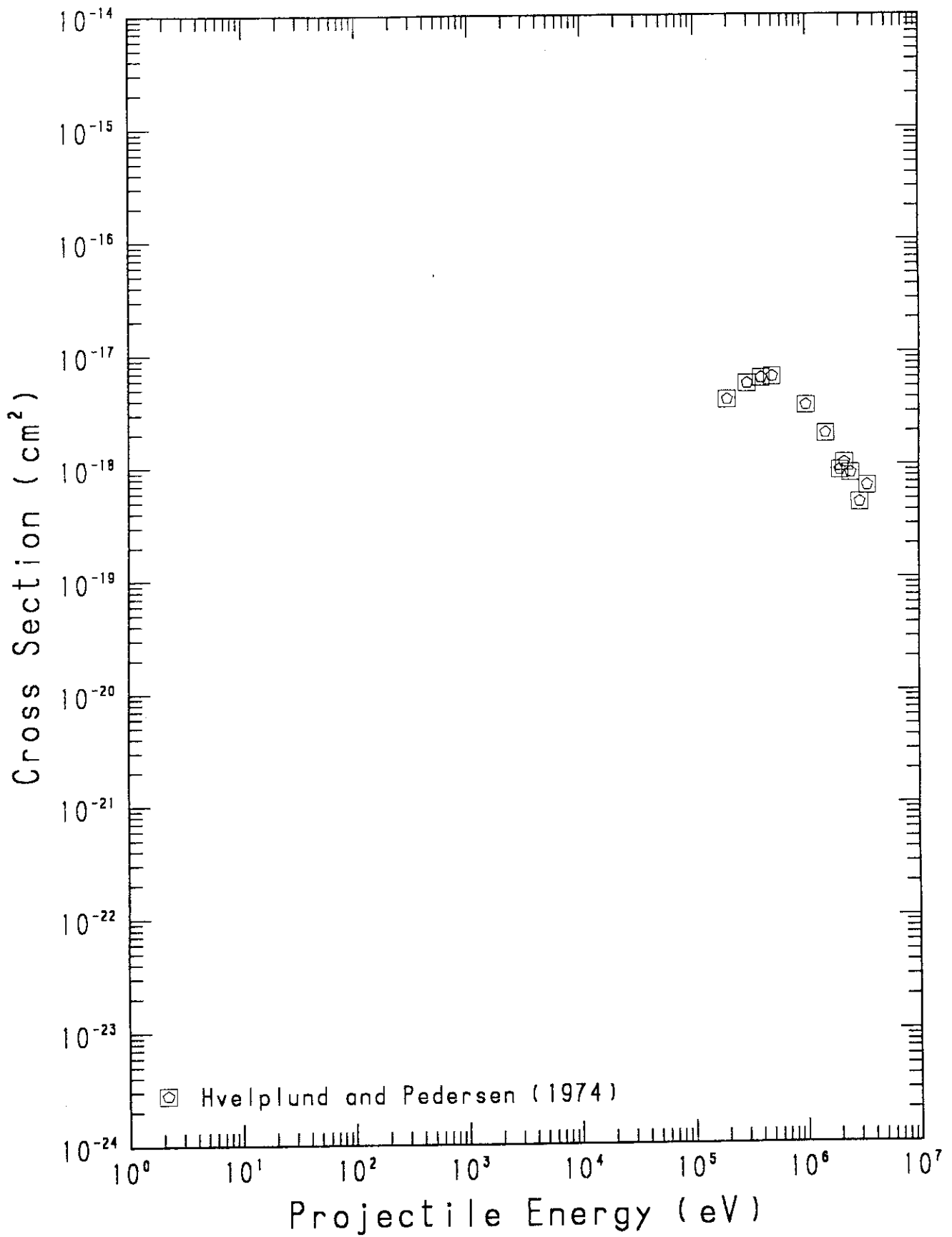


TABLE 33

PROCESS : HE + HE = HE2+ (02)
 HVELPLUND AND PEDERSEN, PHYS. REV. A9 2434 (1974)

DATA FROM FIGURES

E(EV)	V(10(8)*CM/SEC)	SIGMA(CM(2))
2.00E+05	3.11E+00	3.85E-18
3.00E+05	3.80E+00	5.32E-18
4.00E+05	4.39E+00	5.95E-18
5.00E+05	4.91E+00	6.11E-18
1.00E+06	6.95E+00	3.41E-18
1.50E+06	8.51E+00	1.91E-18
2.00E+06	9.82E+00	8.92E-19
2.20E+06	1.03E+01	1.04E-18
2.50E+06	1.10E+01	8.42E-19
3.00E+06	1.20E+01	4.65E-19
3.50E+06	1.30E+01	6.52E-19

Fig.34 He + Ar → He²⁺ (σ₀₂)

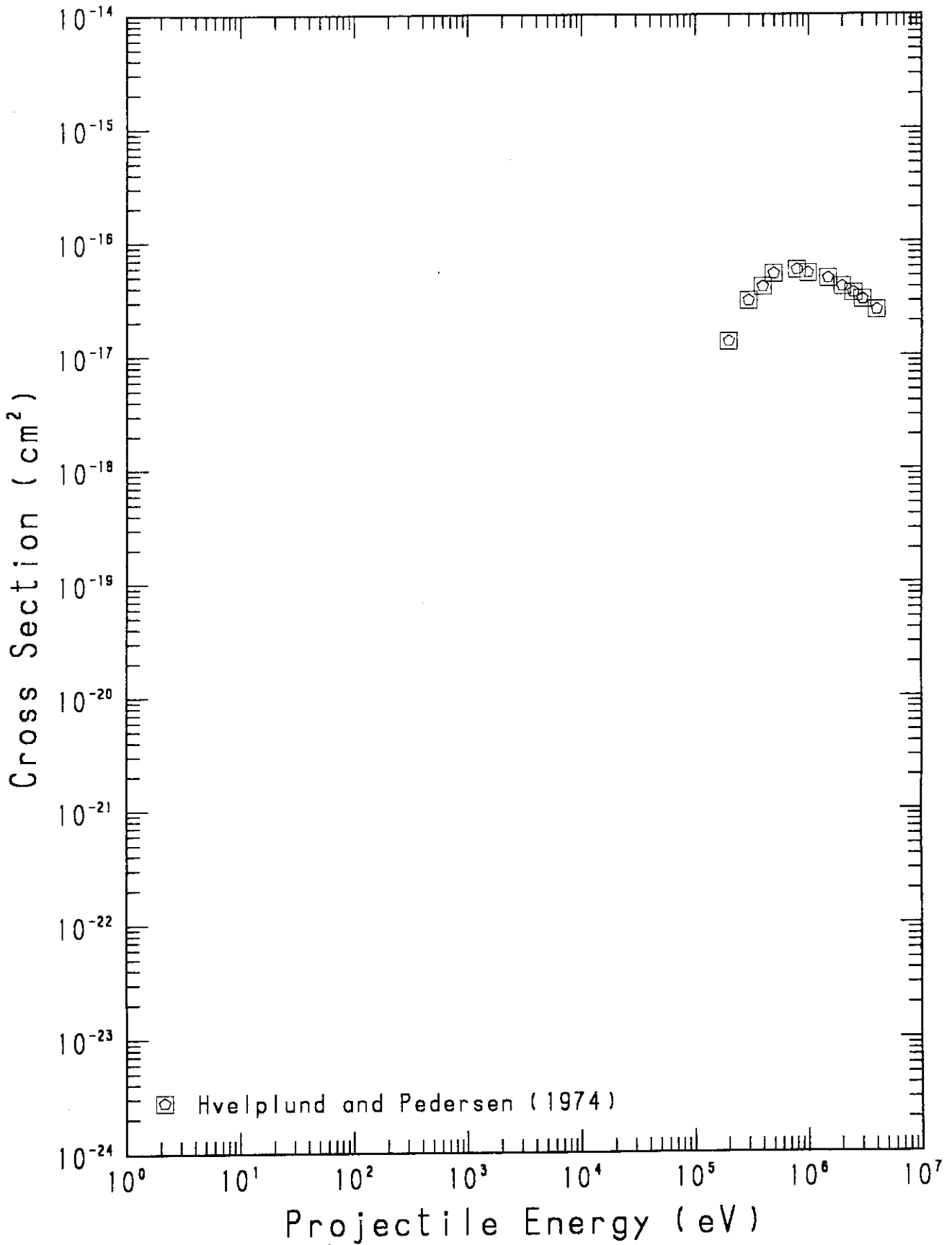


TABLE 34

PROCESS : HE + AR = HE2+ (O2)
 HVELPLUND AND PEDERSEN, PHYS. REV. A9 2434 (1974)

DATA FROM FIGURES

E(EV)	V(10(8)*CM/SEC)	SIGMA(CM(2))
2.00E+05	3.11E+00	1.33E-17
3.00E+05	3.80E+00	3.03E-17
4.00E+05	4.39E+00	4.01E-17
5.00E+05	4.91E+00	5.24E-17
8.00E+05	6.21E+00	5.64E-17
1.00E+06	6.95E+00	5.29E-17
1.50E+06	8.51E+00	4.76E-17
2.00E+06	9.82E+00	4.01E-17
2.50E+06	1.10E+01	3.53E-17
3.00E+06	1.20E+01	3.10E-17
4.00E+06	1.39E+01	2.50E-17

Fig.35 He + Kr → He²⁺ (σ₀₂)

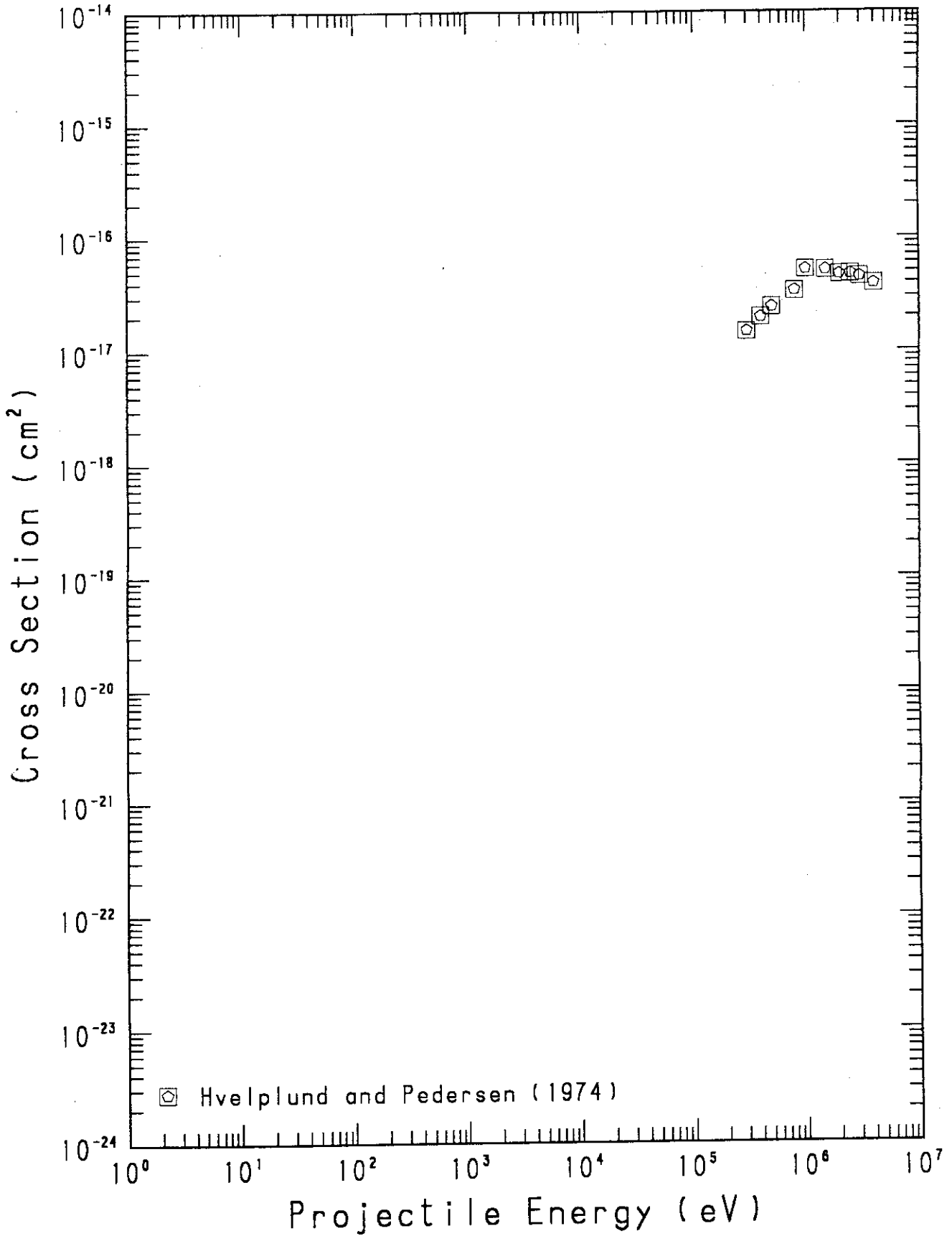


TABLE 35

PROCESS : HE + KR = HE2+ (O2)
HVELPLUND AND PEDERSEN, PHYS. REV. A9 2434 (1974)

DATA FROM FIGURES

E(EV)	V(10(8)*CM/SEC)	SIGMA(CM(2))
3.00E+05	3.80E+00	1.47E-17
4.00E+05	4.39E+00	1.97E-17
5.00E+05	4.91E+00	2.43E-17
8.00E+05	6.21E+00	3.37E-17
1.00E+06	6.95E+00	5.20E-17
1.50E+06	8.51E+00	5.14E-17
2.00E+06	9.82E+00	4.68E-17
2.50E+06	1.10E+01	4.73E-17
3.00E+06	1.20E+01	4.48E-17
4.00E+06	1.39E+01	3.87E-17

Fig.36 $\text{He}^+ + \text{He} \rightarrow \text{He}^{2+}$ (σ_{12})

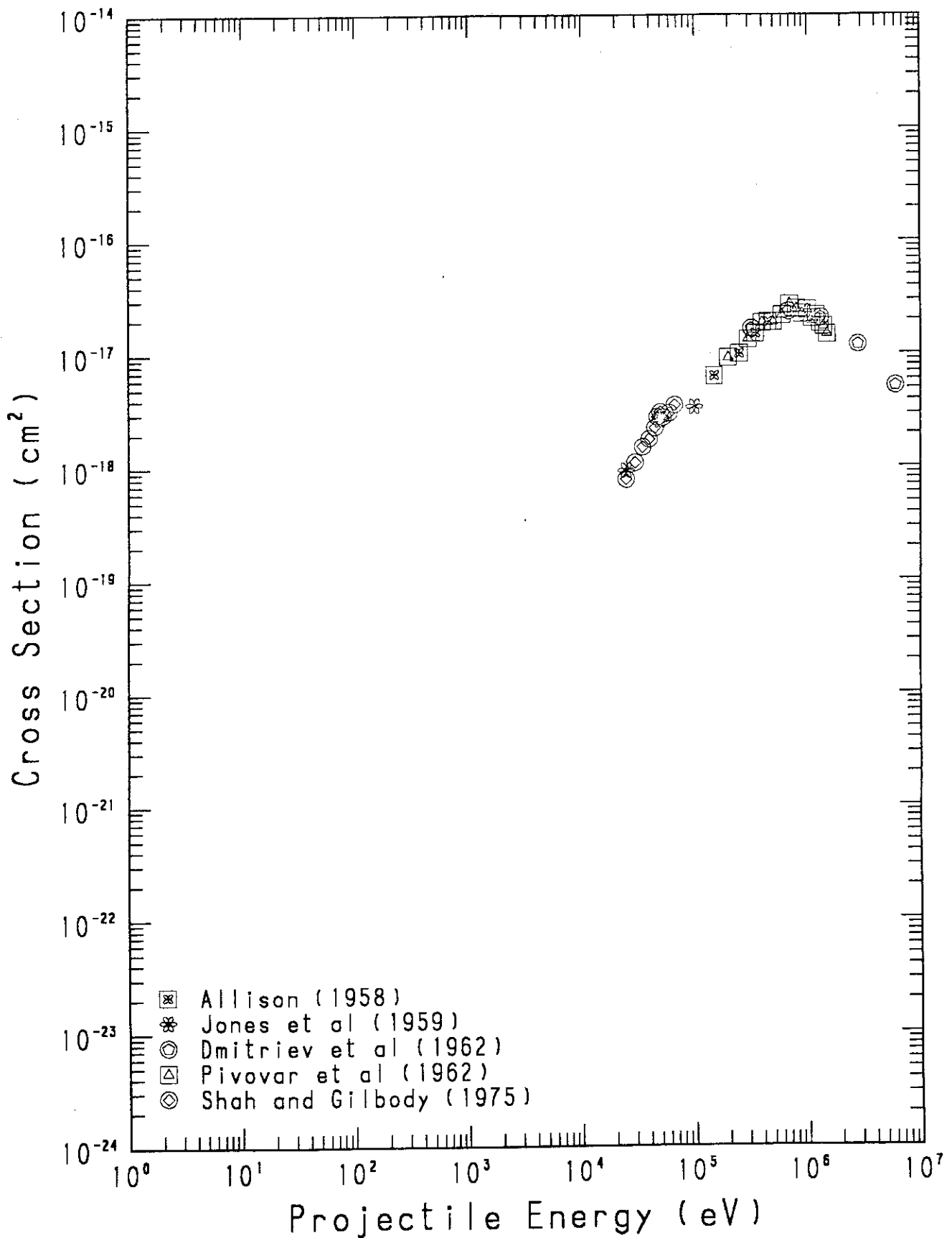


TABLE 36

PROCESS : HE+ + HE = HE2+ (12)
 ALLISON, PHYS. REV. 109 76 (1958)

DATA FROM TABLES

E(EV)	V(10(8)*CM/SEC)	SIGMA(CM(2))
1.50E+05	2.69E+00	6.40E-18
2.50E+05	3.47E+00	1.00E-17
3.50E+05	4.11E+00	1.50E-17
4.50E+05	4.66E+00	1.90E-17

JONES ET AL, PHYS. REV. 113 182 (1959)

DATA FROM TABLES

E(EV)	V(10(8)*CM/SEC)	SIGMA(CM(2))
2.50E+04	1.10E+00	9.30E-19
5.00E+04	1.55E+00	2.60E-18
1.00E+05	2.20E+00	3.40E-18

DMITRIEV ET AL, SOV. PHYS. JETP 15 11 (1962)

DATA FROM FIGURES

E(EV)	V(10(8)*CM/SEC)	SIGMA(CM(2))
3.20E+05	3.93E+00	1.67E-17
6.80E+05	5.73E+00	2.34E-17
1.32E+06	7.98E+00	2.07E-17
2.80E+06	1.16E+01	1.20E-17
6.00E+06	1.70E+01	5.19E-18

TABLE 36 -CONTINUED

PIVOVAR ET AL, SOV. PHYS. JETP 14 20 (1962)

DATA FROM FIGURES

E(EV)	V(10(8)*CM/SEC)	SIGMA(CM(2))
2.00E+05	3.11E+00	9.24E-18
3.00E+05	3.80E+00	1.34E-17
4.00E+05	4.39E+00	1.87E-17
5.00E+05	4.91E+00	1.90E-17
6.00E+05	5.38E+00	2.18E-17
7.00E+05	5.81E+00	2.71E-17
8.00E+05	6.21E+00	2.47E-17
9.00E+05	6.59E+00	2.24E-17
1.00E+06	6.95E+00	2.42E-17
1.10E+06	7.28E+00	2.04E-17
1.20E+06	7.61E+00	2.17E-17
1.30E+06	7.92E+00	1.85E-17
1.40E+06	8.22E+00	1.74E-17
1.50E+06	8.51E+00	1.48E-17

SHAH AND GILBODY, J. PHYS. B8 372 (1975)

DATA FROM FIGURES

E(EV)	V(10(8)*CM/SEC)	SIGMA(CM(2))
2.50E+04	1.10E+00	7.79E-19
3.00E+04	1.20E+00	1.09E-18
3.50E+04	1.30E+00	1.50E-18
4.00E+04	1.39E+00	1.76E-18
4.50E+04	1.47E+00	2.21E-18
4.70E+04	1.51E+00	2.78E-18
5.00E+04	1.55E+00	3.06E-18
5.30E+04	1.60E+00	2.75E-18
6.00E+04	1.70E+00	3.00E-18
6.70E+04	1.80E+00	3.54E-18

Fig.37 $\text{He}^+ + \text{Ne} \rightarrow \text{He}^{2+} (\sigma_{12})$

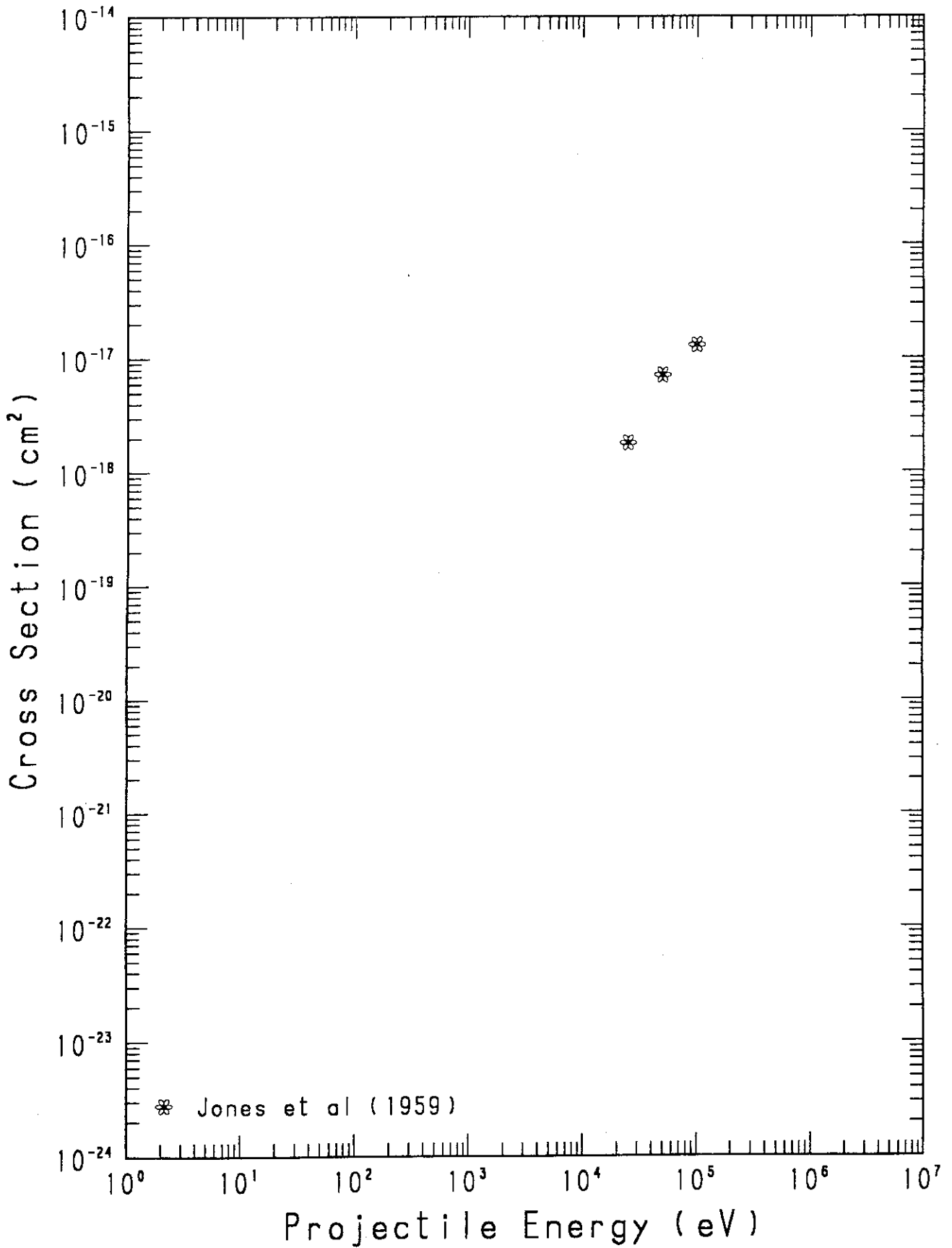


TABLE 37

PROCESS : HE+ + NE = HE2+ (12)
JONES ET AL, PHYS. REV. 113 182 (1959)

DATA FROM TABLES

E(EV)	V(10(8)*CM/SEC)	SIGMA(CM(2))
2.50E+04	1.10E+00	1.80E-18
5.00E+04	1.55E+00	7.10E-18
1.00E+05	2.20E+00	1.30E-17

TABLE 38

PROCESS : HE+ + AR = HE2+ (12)
 JONES ET AL, PHYS. REV. 113 182 (1959)

DATA FROM TABLES

E(EV)	V(10(8)*CM/SEC)	SIGMA(CM(2))
2.50E+04	1.10E+00	4.70E-19
5.00E+04	1.55E+00	2.50E-18
1.00E+05	2.20E+00	7.70E-18

DMITRIEV ET AL, SOV. PHYS. JETP 15 11 (1962)

DATA FROM FIGURES

E(EV)	V(10(8)*CM/SEC)	SIGMA(CM(2))
3.20E+05	3.93E+00	7.61E-17
6.80E+05	5.73E+00	1.47E-16
1.32E+06	7.98E+00	1.32E-16
2.80E+06	1.16E+01	1.03E-16
6.00E+06	1.70E+01	7.72E-17

PIVOVAR ET AL, SOV. PHYS. JETP 14 20 (1962)

DATA FROM FIGURES

E(EV)	V(10(8)*CM/SEC)	SIGMA(CM(2))
2.00E+05	3.11E+00	2.43E-17
3.00E+05	3.80E+00	5.27E-17
4.00E+05	4.39E+00	8.93E-17
5.00E+05	4.91E+00	1.09E-16
6.00E+05	5.38E+00	1.28E-16
7.00E+05	5.81E+00	1.29E-16
8.00E+05	6.21E+00	1.36E-16
9.00E+05	6.59E+00	1.38E-16
1.00E+06	6.95E+00	1.36E-16
1.10E+06	7.28E+00	1.24E-16
1.20E+06	7.61E+00	1.26E-16
1.30E+06	7.92E+00	1.26E-16
1.40E+06	8.22E+00	1.16E-16
1.50E+06	8.51E+00	1.08E-16

TABLE 38 -CONTINUED

SHAH AND GILBODY, J. PHYS. B8 372 (1975)

DATA FROM FIGURES

E(EV)	V(10(8)*CM/SEC)	SIGMA(CM(2))
3.00E+04	1.20E+00	2.82E-19
4.00E+04	1.39E+00	1.10E-18
4.70E+04	1.51E+00	1.54E-18
5.20E+04	1.58E+00	1.91E-18
5.50E+04	1.63E+00	2.55E-18
6.00E+04	1.70E+00	3.12E-18
6.70E+04	1.80E+00	4.13E-18

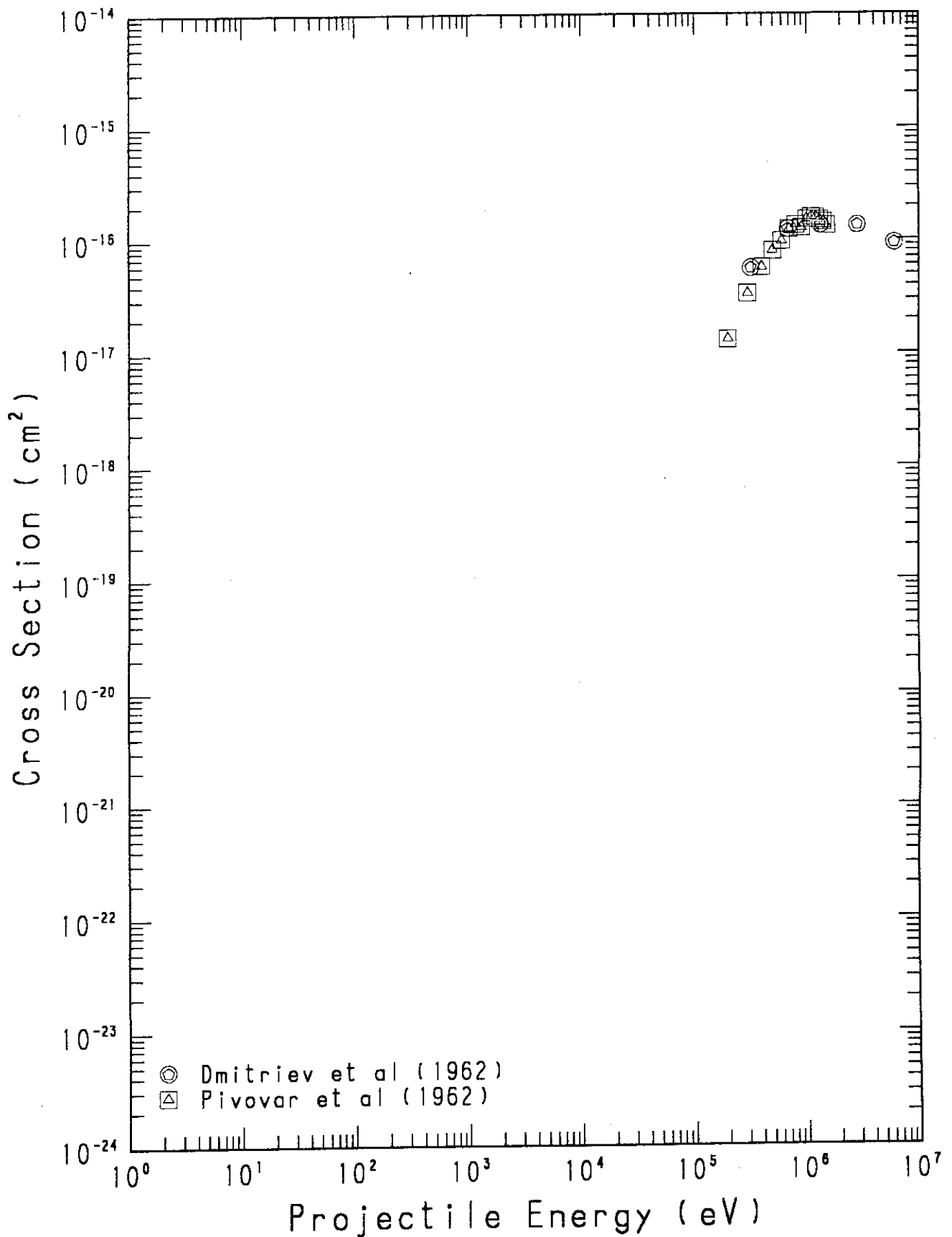
Fig.39 $\text{He}^+ + \text{Kr} \rightarrow \text{He}^{2+}$ (σ_{12})

TABLE 39

PROCESS : HE+ + KR = HE2+ (12)
 DMITRIEV ET AL, SOV. PHYS. JETP 15 11 (1962)

DATA FROM FIGURES

E(EV)	V(10(8)*CM/SEC)	SIGMA(CM(2))
3.20E+05	3.93E+00	5.60E-17
6.80E+05	5.73E+00	1.23E-16
1.32E+06	7.98E+00	1.33E-16
2.80E+06	1.16E+01	1.33E-16
6.00E+06	1.70E+01	9.24E-17

PIVOVAR ET AL, SOV. PHYS. JETP 14 20 (1962)

DATA FROM FIGURES

E(EV)	V(10(8)*CM/SEC)	SIGMA(CM(2))
2.00E+05	3.11E+00	1.33E-17
3.00E+05	3.80E+00	3.35E-17
4.00E+05	4.39E+00	5.69E-17
5.00E+05	4.91E+00	7.93E-17
6.00E+05	5.38E+00	9.65E-17
7.00E+05	5.81E+00	1.23E-16
8.00E+05	6.21E+00	1.34E-16
9.00E+05	6.59E+00	1.26E-16
1.00E+06	6.95E+00	1.51E-16
1.10E+06	7.28E+00	1.58E-16
1.20E+06	7.61E+00	1.56E-16
1.30E+06	7.92E+00	1.49E-16
1.40E+06	8.22E+00	1.42E-16
1.50E+06	8.51E+00	1.32E-16