Appendix D
Ionization and Excitation Cross Sections for Xenon

Ionization and excitation cross sections for xenon are available from the following references:

[1] D. Rapp and P. Englander, "Total Cross Sections for Ionization and Attachment in Gases by Electron Impact. I. Positive Ionization," *The Journal of Chemical Physics*, vol. 43, no. 5, pp. 1464–1479, 1965.

[2] M. Hayashi, "Determination of Electron-Xenon Total Excitation Cross-Sections, from Threshold to 100-eV, from Experimental Values of Townsend's α," *Journal of Physics D: Applied Physics*, vol. 16, pp. 581–589, 1983.

[3] K. Stephen and T.D. Mark, "Absolute Partial Electron Impact Ionization Cross Sections of Xe from Threshold up to 180 eV," *Journal of Chemical Physics*, vol. 81, pp.3116–3117, 1984.

[4] J. A. Syage, "Electron Impact Cross Sections for Multiple Ionization of Kr and Xe," *Physical Review A*, vol. 46, pp. 5666–5680, 1992.

The ionization and excitation cross sections for xenon from threshold to 100 eV from the above references are plotted in Fig. D-1 and tabulated in Table D-1.

Ionization and excitation cross sections for other gases such as argon and krypton are available from the following references:

[5] M. Hayashi, *Bibliography of Electron and Photon Cross Sections with Atoms and Molecules Published in the 20th Century: Argon*, NIFS-DATA-72, National Institute for Fusion Science (Japan), ISSN 0915-6364, 2003.

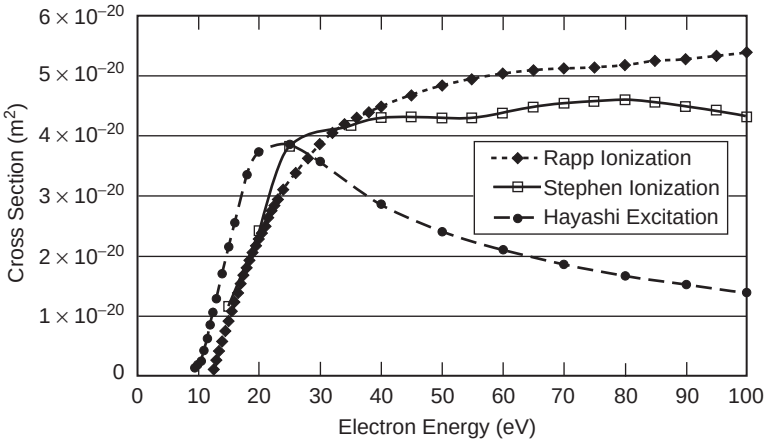

Fig. D-1. Ionization and excitation cross sections for xenon.

[6] R. Rejoub, B. G. Lindsay, and R. F. Stebbings, "Determination of the Absolute Partial and Total Cross Sections for Electron-Impact Ionization of Rare Gases," *Physical Review A*, 042713, vol. 65, 2002.

[7] A. Yanguas-Gil, J. Cotrino, and L. L. Alves, "An Update of Argon Inelastic Cross Sections for Plasma Discharges," *Journal of Physics D*, vol. 38, pp. 1588–1598, 2005.

[8] G. G. Raju, "Electron-Atom Collision Cross Sections in Argon: An Analysis and Comments," *IEEE Transactions on Dielectrics and Electrical Insulation*, vol. 11, pp. 649–673, 2004.

[9] A. A. Sorokin, L. A. Shmaenok, S. V. Bobashey, B. Mobus, H. Richter, and G. Ulm, "Measurements of Electron-Impact Ionization Cross Sections of Argon, Krypton, and Xenon by Comparison with Photoionization," *Physical Review A*, 022723, vol. 61, 2000.

Table D-1. Ionization and excitation cross sections for xenon.

Electron Energy (eV)	Rapp and Englander [1] Ionization (m^2)	Stephen and Mark [3] Ionization (m^2)	Hayashi [2] Total Excitation (m^2)
			2.6×10^{-22}
9.0			1.26×10^{-21}
9.5			1.31×10^{-21}
10.0			1.8×10^{-21}
10.5			2.4×10^{-21}
11			$4. \times 10^{-21}$
11.5			6.2×10^{-21}
12			8.4×10^{-21}
12.5	1.099×10^{-21}		1.05×10^{-20}
13.0	2.558×10^{-21}		1.28×10^{-20}
13.5	4.123×10^{-21}		
14.0	5.714×10^{-21}		1.7×10^{-20}
14.5	7.420×10^{-21}		
15.0	9.055×10^{-21}	1.15×10^{-20}	2.14×10^{-20}
15.5	1.073×10^{-20}		
16.0	1.231×10^{-20}		2.55×10^{-20}
16.5	1.380×10^{-20}		
17.0	1.529×10^{-20}		
17.5	1.670×10^{-20}		
18.0	1.802×10^{-20}		3.35×10^{-20}
18.5	1.925×10^{-20}		
19.0	2.048×10^{-20}		
19.5	2.163×10^{-20}		
20.0	2.277×10^{-20}	2.42×10^{-20}	3.73×10^{-20}
20.5	2.382×10^{-20}		
21.0	2.488×10^{-20}		
21.5	2.619×10^{-20}		
22.0	2.734×10^{-20}		
22.5	2.831×10^{-20}		
23.0	2.928×10^{-20}		
24.0	3.095×10^{-20}		
25.0		3.81×10^{-20}	3.85×10^{-20}
26.0	3.367×10^{-20}		
28.0	3.613×10^{-20}		
30.0	3.851×10^{-20}		3.57×10^{-20}
32.0	4.044×10^{-20}		

Table D-1. (continued).

Electron Energy (eV)	Rapp and Englander [1] Ionization (m^2)	Stephen and Mark [3] Ionization (m^2)	Hayashi [2] Total Excitation (m^2)
34.0	4.185×10^{-20}		
35.0		4.17×10^{-20}	
36.0	4.290×10^{-20}		
38.0	4.387×10^{-20}		
40.0	4.475×10^{-20}	4.30×10^{-20}	2.85×10^{-20}
45.0	4.677×10^{-20}	4.31×10^{-20}	
50.0	4.835×10^{-20}	4.29×10^{-20}	2.4×10^{-20}
55.0	4.941×10^{-20}	4.27×10^{-20}	
60.0	5.029×10^{-20}	4.37×10^{-20}	2.1×10^{-20}
65.0	5.081×10^{-20}	4.47×10^{-20}	
70.0	5.117×10^{-20}	4.54×10^{-20}	1.85×10^{-20}
75.0	5.134×10^{-20}	4.57×10^{-20}	
80.0	5.178×10^{-20}	4.59×10^{-20}	1.66×10^{-20}
85.0	5.249×10^{-20}	4.55×10^{-20}	
90.0	5.266×10^{-20}	4.48×10^{-20}	1.52×10^{-20}
95.0	5.328×10^{-20}	4.42×10^{-20}	
100.0	5.380×10^{-20}	4.31×10^{-20}	1.38×10^{-20}