Contents

Li	t of Symbols and Abbreviations	1
Li	t of Reactions	3
1.	Introduction	7
	1.1 Previous Surveys	8
	1.2 Scope of Present Survey	9
	1.3 Organization of Information	9
	1.4 Sources and Criteria for Selection and Evaluation of Dat	a. 10
	1.5 Accuracy	11
	1.6 References	11
	1.7 Digitization of the Cross Sections	12
	1.8 Calculation of Reaction Rate Coefficients	12
	1.9 Numerical Fits to σ and $\langle \sigma v \rangle$	13
	1.10 Example of Use of Fits	14
2.	Electron Impact Collision Processes	17
	2.1 Electron Collisions with H and H ⁺	
	2.2 Electron Collisions with H_2 , H_2^+ , and H_3^+	34
	2.3 Electron Collisions with He, He ⁺ , and He ²⁺	70
3.	Proton Impact Collision Processes	115
	3.1 Proton Collisions with H	116
	3.2 Proton Collisions with H ₂ and H ₂ ⁺	138
	3.3 Proton Collisions with He and He*	152
4.	Collision Processes and Reactions of ${ m H}_2^+$ Ions	167
	4.1 General Remarks	
	4.2 Collisions of H ₂ ⁺ with H	170
	4.3 Collisions of H_2^{\uparrow} with H_2	172
	4.4 Collisions of H ₂ ⁺ with He	178

5.	Col	lision Processes of He ⁺	181
	5.1 5.2 5.3	General Remarks	183 184 190
6.	Col	lision Processes of He ²⁺	195
	6.1 6.2 6.3	Collisions of $\mathrm{He^{2+}}$ with H	196 208 212
7.	Col	lision Processes of H ⁻	217
	7.1 7.2 7.3	Electron Collisions with H ⁻ Proton Collisions with H ⁻ Collisions of H with H ⁻	218 222 228
8.	Ana	dytic Fits	233
	8.1 8.2 8.3	Fits for σ	234 256 265
Ap	pen	dix	313
В.	for . Pote	Illator Strengths, Radiative Rates, and Excitation Energies Hydrogen and Helium ential Energy Diagram for H ₂ and H ₂ ⁺	314 318
В.	for . Pote	Hydrogen and Helium	