

Contents

Preface	iii
Glossary	vii
1. Introduction	1
1.1. Purpose and scope	1
1.2. Background	1
1.3. New Features	2
2. Formulae for the Collision Stopping Power	4
2.1. General Formulae	4
2.2. Stopping-Power Formulae for Heavy Charged Particles	4
2.3. Stopping-Power Formulae for Electrons and Positrons	5
3. Methods for Estimating Mean Excitation Energies	7
3.1. Use of Oscillator-Strength and Dielectric Data	7
3.2. Use of Stopping-Power and Range Data	10
3.2.1. Bichsel's Shell Corrections	10
3.2.2. Comparison of Bichsel's and Bonderup's Shell Corrections	12
4. Selection of Mean Excitation Energies for Elements	15
5. Selection of Mean Excitation Energies for Compounds	23
6. Density Effect	32
6.1. General Equations	32
6.2. Sternheimer's Model	32
6.3. Numerical Evaluation	33
6.4. Complications for Inhomogeneous Media	34
7. Restricted Collision Stopping Power	36
8. Electron Collision Stopping Powers at Low Energies	39
8.1. Calculations for Gases	39
8.2. Calculations for Solids and Liquids	39
8.3. Comparison of Stopping Powers	39
9. Radiative Stopping Power	45
9.1. Electron-Nucleus Bremsstrahlung	45
9.1.1. High-Energy Region	45
9.1.2. Low-Energy Region	45
9.1.3. Intermediate-Energy Region	46
9.2. Electron-Electron Bremsstrahlung	47
9.2.1. High-Energy Region	47
9.2.2. Low-Energy Region	47
9.2.3. Intermediate-Energy Region	47
9.3. Accuracy and Comparison with Experiments	48
9.4. Positron Bremsstrahlung	48
10. Ranges and Radiation Yields	50
11. Miscellaneous Comparisons	51
11.1. Positron-Electron Differences	51
11.2. Comparison of Calculated and Experimental Stopping Powers	52
11.3. Comparisons with Previous Calculations	54
12. Main Tables: Stopping Powers, Ranges, and Radiation Yields	55
12.1. Description of Tables	55
12.1.1. Quantities Tabulated	55
12.1.2. Note on Treatment of Density Effect	55
12.1.3. List of Materials Included	55
12.1.4. Accuracy	56
12.2. Extension of Water Data to Other Similar Materials	56
References	260
ICRU Reports	268
Index	271

