

# Contents

Introduction .....	1
--------------------	---

---

## Part 1 Fundamental Excitations

---

1.1 Fundamental Excitations in Solids Pertinent to Desorption Induced by Electronic Transitions. By J.W.Gadzuk (With 10 Figures) .....	4
1.2 An Analysis of Electronic Desorption By D.R. Jennison (With 1 Figure) .....	26
1.3 Direct and Indirect Mechanisms of Stimulated Desorption By J.C. Tully (With 2 Figures) .....	31

---

## Part 2 Desorption Processes

---

2.1 Mechanisms of Electron-Stimulated Desorption By R. Gomer (With 6 Figures) .....	40
2.2 Mechanisms of Electronically Induced Desorption of Ions and Neutrals. By D. Menzel .....	53
2.3 Mechanisms of "Electronic" Desorption. By P.J. Feibelman .....	61
2.4 Models for Desorption in Covalent Systems By D.E. Ramaker (With 7 Figures) .....	70
2.5 The Role of the Excited State in DIET Electronic Structure and Evolution in Time. By W. Brenig (With 8 Figures) .....	90

---

## Part 3 Desorption Spectroscopy

---

3.1 On the Nature of the ESD Active Species on Metal Surfaces By E. Bauer (With 5 Figures) .....	104
3.2 Photodesorption and Negative Ion ESD. By D. Lichtman .....	117
3.3 The Determination of Molecular Structure at Surfaces Using Angle Resolved Electron- and Photon-Stimulated Desorption By T.E. Madey, F.P. Netzer, J.E. Houston, D.M. Hanson, and R. Stockbauer (With 9 Figures) .....	120

3.4	Stimulated Desorption Spectroscopy By M.L. Knotek (With 11 Figures) .....	139
3.5	The Electronic Desorption of Excited Alkali Atoms from Alkali Halide Surfaces By N.H. Tolk, W.E. Collins, J.S. Kraus, R.L. Morris, T.R. Pian, M.M. Traum, N.G. Stoffel, and G. Margaritondo (With 2 Figures) ..	156

---

**Part 4 Molecular Dissociation**

---

4.1	Dissociation in Small Molecules. By P.M. Dehmer (With 2 Figures) .	164
4.2	The Coulomb Explosion and Recent Methods for Studying Molecular Decomposition. By T.A. Carlson (With 5 Figures) .....	169

---

**Part 5 Ion-Stimulated Desorption**

---

5.1	Desorption Stimulated by Ion Impact By P. Williams (With 4 Figures) .....	184
5.2	$F^+$ Ejection from LiF Surfaces by Ion Bombardment. By J.A. Schultz, P.T. Murray, R. Kumar, H.-K. Hu, and J.W. Rabalais (With 3 Figures)	191
5.3	Similarities in the Relative Populations of Excited States Produced by Sputtering and by Electron Impact By R. Kelly (With 4 Figures) .....	197
5.4	Erosion of Dielectric Solids by High-Energy Ions By T.A. Tombrello (With 5 Figures) .....	207

---

**Part 6 Electronic Erosion**

---

6.1	Sputtering of Alkali Halides by Electrons By M. Szymoński and A.E. de Vries (With 2 Figures) .....	216
6.2	The Contribution of Electronic Processes in Sputtering By P.D. Townsend and F. Lama (With 5 Figures) .....	220
6.3	Mechanisms for Defect Creation in Alkali Halides. By N. Itoh ....	229

---

**Part 7 Condensed Gas Desorption**

---

7.1	The Non-Linear Erosion Yield of Condensed Gas Solids Electronically Excited by Fast Light Ions By W.L. Brown, W.M. Augustyniak, L.J. Lanzerotti, K.J. Marcantonio, and R.E. Johnson (With 2 Figures) .....	234
7.2	Desorption of Condensed Gases and Organic Molecules by Electronic Processes. By T.A. Tombrello (With 8 Figures) .....	239

7.3	Photon-Stimulated Ion Desorption from Condensed Molecules: N <sub>2</sub> , CO, C <sub>2</sub> H <sub>2</sub> , CH <sub>3</sub> OH, N <sub>2</sub> O, D <sub>2</sub> O, and NH <sub>3</sub> . By R.A. Rosenberg, V. Rehn, A.K. Green, P.R. LaRoe, and C.C. Parks (With 9 Figures) .	247
7.4	Electron-Stimulated Desorption from Condensed Branched Alkanes By J.A. Kelber and M.L. Knotek (With 2 Figures) .....	262
7.5	PSD and ESD of Condensed Films: Relevance to the Mechanism of Ion Formation and Desorption By R. Stockbauer, E. Bertel, and T.E. Madey .....	267
	<i>Index of Contributors</i> .....	269