

# 1

## Ultrahigh Vacuum Technology

- 1-1 Introduction, 2
- 1-2 The History of Ultrahigh Vacuum Technology, 5

# 2

## Ultrahigh Vacuum Components

- 2-1 Introduction, 8
- 2-2 Fundamental Vacuum System Considerations, 8
- 2-3 Pumps for Ultrahigh Vacuum, 10
- 2-4 Gauges for Ultrahigh Vacuum Measurement, 30
- 2-5 Bakeable Gauges for Pressures  $>10^{-5}$  Torr, 50
- 2-6 Valves for Ultrahigh Vacuum, 58
- 2-7 Accessories for Ultrahigh Vacuum, 62

# 3

## Material of Construction

- 3-1 Introduction, 84
- 3-2 Glass, 95
- 3-3 Ceramic Refractory Materials, 105
- 3-4 Metals, 109

# 4

## Ultrahigh Vacuum Systems

- 4-1 Introduction, 122
- 4-2 Assembly, 122
- 4-3 Typical Systems, 125
- 4-4 Leak Detection, 130
- 4-5 Operation, 131

## 5

### Generation of Clean Surfaces

- 5-1 Introduction, 136
- 5-2 Evaporation, 137
- 5-3 High Temperature Heating of Bulk Metal, 142
- 5-4 Ion Bombardment (Sputtering), 143
- 5-5 Cleaving of Single Crystals, 144
- 5-6 Field Desorption, 145

## 6

### Physical Properties of Surfaces

- 6-1 Introduction, 148
- 6-2 Thermionic and Field Emission from Surfaces, 148
- 6-3 Field Emission and Field Ion Microscopes, 153
- 6-4 Low Energy Electron Diffraction, 157
- 6-5 Electron Emission by Ions and Electrons, 161
- 6-6 Flash Filament Experiments, 165

## 7

### Miscellaneous Applications

- 7-1 Physical and Chemical Properties of Thin Films, 174
- 7-2 Boundary Lubrication of Metals, 177
- 7-3 Space Simulation, 179

### Appendix—General References

- A Ultrahigh Vacuum References, 186
- B General Vacuum References, 186
- C Journals, 187

### Index

- A Name Index, 189
- B Subject Index, 193