Matrix-Isolation Techniques
A Practical Approach

IAN R. DUNKIN
Department of Pure and Applied Chemistry
University of Strathclyde, Glasgow, UK

OXFORD NEW YORK TOKYO
OXFORD UNIVERSITY PRESS
1998
Contents

Abbreviations ix
Acknowledgements x

1. Matrix isolation—an introduction to the technique 1
   1. A brief history of matrix isolation 2
   2. Matrix-isolation experiments—some general considerations 12
   References 25

2. Equipment: the matrix-isolation cold cell 27
   1. Introduction 27
   2. Refrigerators 28
   3. Sample holders 32
   4. Vacuum shrouds for matrix isolation 39
   5. Temperature measurement and control 54
   6. The main vacuum system 57
   7. Trolleys 64
   8. Care and maintenance of a matrix-isolation system 72
   References 78

3. Equipment: ancillaries 79
   1. Preparative vacuum lines 79
   2. Generating reactive species 87
   3. Spectrometers for matrix isolation 96
   References 98

4. Basic procedures for matrix preparation 99
   1. Host gases 99
   2. Manipulating gases and volatile materials 101
   3. Deposition of matrices 126
   References 141

5. Matrix photochemistry and spectroscopy with plane-polarized light 143
   1. Photoselection and linear dichroism 143
2. Experimental techniques for polarized photolysis and polarized spectroscopy of matrices

References

6. Classic matrix experiments

1. Stable molecules and molecular complexes in matrices
2. Reactive species in matrices
3. Finale

References

A1 List of suppliers

Index