

CONTENTS

CHAPTER 1 BASIC NUCLEAR PROPERTIES AND ACTIVATION ANALYSIS	1
1-1 REACTIONS	1
1-2 DECAY	3
1-3 DECAY SCHEMES	4
1-4 INTERACTIONS	5
1-5 DETECTION	7
1-6 QUALITATIVE ANALYSIS	7
1-7 QUANTITATIVE ANALYSIS	7
1-8 ABSOLUTE DETERMINATIONS	9
1-9 SENSITIVITY CALCULATIONS	10
1-10 ERRORS	12
1-11 ACTIVATION ANALYSIS WITH DAUGHTER ACTIVITIES	13
CHAPTER 2 REACTOR NEUTRON FLUX: CHARACTERISTICS AND USES	14
2-1 CHARACTERISTICS OF NUCLEAR REACTORS	14
2-2 APPLICATION, EXPERIMENTAL METHODS, AND TECHNIQUES	22
2-3 USEFUL NUCLEAR REACTIONS WITH REACTOR NEUTRONS	24
CHAPTER 3 NONREACTOR NEUTRON SOURCES	33
3-1 ACCELERATOR NEUTRON SOURCES	33
3-2 ISOTOPIC NEUTRON SOURCES	44
CHAPTER 4 RADIOCHEMICAL SEPARATIONS	55
4-1 CHOICE OF A SEPARATION TECHNIQUE	56
4-2 SEPARATION EFFICIENCIES	56
4-3 SEPARATION METHODS	58
CHAPTER 5 RADIATION DETECTORS AND COUNTING STATISTICS	62
5-1 GAS-FILLED COUNTERS	62
5-2 SEMICONDUCTOR DETECTORS OF RADIATION	69
5-3 COUNTING STATISTICS	72
CHAPTER 6 SCINTILLATION COUNTING TECHNIQUES	80
6-1 SCINTILLATOR AND ANALYZER TYPES	80
6-2 GAMMA-RAY SPECTRA INTERPRETATION	88
6-3 CHOICE OF MULTICHANNEL ANALYZER	96
6-4 APPLICATION OF THE MULTICHANNEL ANALYZER TO ACTIVATION ANALYSIS PROBLEMS	100
6-5 GAMMA-RAY SPECTRA RESOLUTION	104

CHAPTER 7 PRESENT BYWAYS AND FUTURE TRENDS IN ACTIVATION ANALYSIS	108
7-1 OTHER NUCLEAR METHODS OF ANALYSIS	108
7-2 FUTURE TRENDS IN ACTIVATION ANALYSIS	113
CHAPTER 8 PRACTICAL EXAMPLES OF ACTIVATION ANALYSIS	116
8-1 DETERMINATION OF SODIUM IN CADMIUM NITRATE	117
8-2 DETERMINATION OF PHOSPHORUS IN SKIN TISSUE	121
8-3 ANALYSIS OF VANADIUM IN AN IRON MATRIX	127
8-4 DETERMINATION OF OXYGEN, PHOSPHORUS AND NITROGEN IN A TYPICAL PHOSPHINE OXIDE DERIVATIVE	133