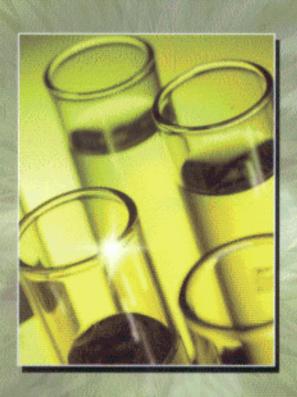


The Molecular World



Separation, Purification and Identification

edited by Lesley Smart

CONTENTS

PART 1 CHEMISTRY: A PRACTICAL SUBJECT

Adrian Dobbs and Lesley Smart

1	INTRODUCTION: PREPARATION OF A COMPOUND			
	1.1	Planning a reaction	11	
	1.2	Assembling the apparatus: doing the reaction	12	
	1.3	Summary of Section 1	20	
2	SEPARATING AND PURIFYING THE PRODUCT			
	2.1	Solvent extraction and separation	23	
	2.2	Separation by distillation	34	
	2.3	Chromatography	41	
		2.3.1 Thin-layer chromatography	41	
		2.3.2 Column chromatography	45	
	2.4	Recrystallization	50	
	2.5	Which technique to use?	51	
	2.6	Summary of Section 2	52	
3	- , -	MPLETING A SYNTHESIS	53	
4		ECKING FOR PURITY	54	
	4.1	How pure is pure?	54	
5	IDENTIFYING A COMPOUND			
	5.1	Elemental analysis	56	
		5.1.1 Carbon, hydrogen and nitrogen analysis	56	
		5.1.2 Other elemental analyses	57	
		5.1.3 Atomic spectroscopy	58	
	5.2	Finding the empirical formula	63	
	5.3	Mass spectrometry	65	
	5.4	Summary of Section 5	73	
	5.4	Summary of Section 5		

	. •
LEARNING OUTCOMES FOR PART 1	76
QUESTIONS: ANSWERS AND COMMENTS	78
FURTHER READING	86
ACKNOWLEDGEMENTS	86

75

6 CONCLUSION TO PART 1

PART 2 SPECTROSCOPY

Lesley Smart and Eleanor Crabb

PREAMBLE

CONTENTS OF THE SPECTROSCOPY CD-ROM





89

CASE STUDY: FORENSIC SCIENCE

Andy Platt, Anya Hunt and Lesley Smart

1	INTRODUCTION		93
2	CAS	SE 1: THE ATLANTA CHILD MURDERS	94
	2.1	The incidents	94
	2.2	The investigation	94
3	CASE 2: POSSESSION OF HEROIN		
	3.1	The incident	100
	3.2	The investigation	102
4	CAS	SE 3: THE ATTEMPTED MURDER OF ALAN SMITH	106
	4.1	The incident	106
	4.2	The investigation	107
5	CAS	SE 4: THE HINDENBURG DISASTER	110
	5.1	The incident	110
	5.2	Original investigation	113
	5.3	Recent scientific investigation	114
ACI	ACKNOWLEDGEMENTS		
INDEX			117
CD-ROM INFORMATION			120