

CONTENTS

1. General Discussion of Organic Fluorine Chemistry	1
I. General Introduction	1
II. Electronic Effects in Fluorocarbon Systems	4
III. Nomenclature	8
IV. Historical Development	10
2. Preparation of Highly Fluorinated Compounds	14
I. Source of Fluorine	14
II. Fluorination with Metal Fluorides	15
III. Electrochemical Fluorination	26
IV. Fluorination with Elemental Fluorine	29
V. Halogen Fluorides	33
References	34
3. Partial or Selective Fluorination	38
I. Displacement of a Single Atom or Group Using Metal Fluorides	38
II. Replacement of Hydrogen by Fluorine	45
III. Replacement of Hydroxyl by Fluorine	45
IV. Miscellaneous	46
V. Fluorination of Carbonyl Compounds and Others	48
VI. Additions to Olefins and Acetylenes	53
References	59
4. The Influence of Fluorine of fluorocarbon Groups on Some Reaction Centres	64
I. Introduction	64
II. Electronic Effects of Polyfluoroalkyl Groups	65
III. Strengths of Unsaturated Fluoro Acids and Fluoro Bases	71
IV. Fluorocarbonium Ions	73
V. Fluorocarbanions	84
References	95
5. Nucleophilic Displacement of halogen from Fluorocarbon Systems	97
I. Substituent Effects of Fluorine or Fluorocarbon Groups on the S _N 2 Process	97
II. Fluoride Ion as a Leaving Group	99
References	108
6. Elimination Reactions	109
I. β Elimination of hydrogen Halides	109
II. β Elimination of Metal Fluorides	117
III. α Eliminations, Generation, and Reactivity of Fluorocarbenes and Polyfluoroalkylcarbenes	119
References	134
7. Polyfluoroalkanes, Polyfluoroalkenes, Polyfluoroalkynes, and Derivatives	138

I. Perfluoroalkanes and Perfluorocycloalkanes	138
II. Perfluoroalkenes and Perfluorocycloalkenes	142
III. Fluoroacetylenes and Fluoroalkylacetylenes	189
8. Functional Compounds Containing Oxygen, Sulphur or Nitrogen and Their Derivatives	209
I. Oxygen Derivatives	209
II. Sulphur Derivatives	233
III. Nitrogen Derivatives	241
References	252
9. Polyfluoroaromatic Compounds	261
I. Synthesis	261
II. Properties and Reactions	274
References	334
10. Organometallic Compounds	344
I. General Methods of Synthesis	345
II. Lithium and Magnesium	347
III. Zinc Cadmium and Mercury	353
IV. Boron Aluminum Thallium	359
V. Silicon Germanium Tin and Lead	365
VI. Transition Metals	370
References	378
Index	385