

Contents

	Page No.
List of Abbreviations	i
List of Schemes	iii
List of Tables	viii
List of Figures	ix
Abstract	xii
Chapter 1. Review : Phenanthridine-annelated heterocyclic compounds	1-43
1.1 Introduction	1
1.2 Synthesis	5
1.2.1 Synthesis of six-membered ring-fused phenanthridines	
1.2.2 Synthesis of five-membered ring-fused phenanthridines	
1.3 Structural Studies	36
1.4 Reactions	40
1.5 Applications	41
Chapter 2. Synthesis and characterization of 1,3-bis(alkoxycarbonyl)-1,3-azaphospholo [1,5-f]phenanthridines	44-75
2.1 Introduction	44
2.1.1 [4+1]Cyclocondensation	
2.1.2 [3+2]Cyclocondensation	
2.1.3 [3+2]Cycloaddition	
2.1.4 1,5-Electrocyclization	
2.2 Results and Discussion	55
2.2.1 Synthesis and characterization of N-alkylphenanthridinium salts	
2.2.1.1 Experimental	
2.2.1.2 Spectral characterization	
2.2.2 Synthesis of 1,3-bis(alkoxycarbonyl)-1,3-azaphospholo[1,5-f]phenanthridines through 1,5- electrocyclization and characterization of the compounds	
2.2.2.1 Experimental	
2.2.2.2 Spectral characterization	
2.3 Experimental details	72
2.3.1 Material	
2.3.2 Instrumentation	
2.3.3 Synthesis	
2.4 Conclusion	75
Chapter 3. Diels-Alder reaction of 1,3-bis(methoxycarbonyl)-1,3-azaphospholo[1,5-f]phenanthridine	76-103
3.1 Introduction	76
3.1.1 Electrophilic substitution	

3.1.2	N-Alkylation	
3.1.3	Addition reaction on >C=P functionality	
3.1.4	Other 1, 2-Addition Reactions on C=P or N=P bond	
3.2	Results and Discussion	94
3.2.1	Experimental	
3.2.2	Spectral characterization	
3.3	Experimental details	101
3.3.1	Material	
3.3.2	Instrumentation	
3.3.3	Synthesis	
3.4	Conclusion	103
Chapter 4.	Synthesis of pyrrolo[1,2-f]phenanthridines through 1,3-dipolar cycloaddition and spectral characterization of the compounds.	104-127
4.1	Introduction	104
4.2	Results and Discussion	118
4.2.1	Experimental	
4.2.2	Structural elucidation of [2+4] cycloadduct	
4.3	Experimental details	126
4.3.1	Material	
4.3.2	Instrumentation	
4.3.3	Synthesis	
4.4	Conclusion	127
Chapter 5.	Regioselectivity in 1,3-dipolar cycloaddition of N-phenanthridinium phenacylide: Theoretical and experimental investigation.	128-148
5.1	Introduction	128
5.2	Results and Discussion	129
5.2.1	Experimental results	
5.2.1.1	Reaction of phenanthridinium phenacylide with methyl propiolate and methyl acrylate	
5.2.1.2	Characterization of the product	
5.2.1.3	Reaction of phenanthridinium phenacylide with acrylonitrile	
5.2.1.4	Characterization of the product	
5.2.2	Theoretical results	
5.3	Experimental Details	145
5.4	Computational Details	146
5.5	Conclusion	147
Chapter 6	Summary	149-161
	References	162-175
	Supplementary Information	
	List of Publications and Reprints	
