

# Contents

<b>1</b>	<b>Research Background of Total Synthesis of Natural Product Maoecrystal V and Its Family</b>	<b>1</b>
1.1	Introduction to the Research Background of Total Synthesis of Natural Products	1
1.2	Terpenoids	4
1.3	Ent-Kaurane Diterpene	5
1.4	Isolation and Structure Identification of Diterpenoid Natural Product Maoecrystal V	7
1.5	Biosynthetic Hypothesis for Maoecrystal V	8
1.6	Bioactivity of Maoecrystal V	8
1.7	A Brief Review on Synthesis Works of Maoecrystal V	9
1.7.1	The Synthetic Strategy of Our Group	9
1.7.2	The Synthesis Research of Baran's Group	17
1.7.3	The Synthesis Research of Danishefsky's Group	18
1.7.4	The Synthesis Research of Nicolaou's Group	21
1.7.5	The Synthesis Research of Singh's Group	22
1.7.6	The Synthesis Research of Thomson's Group	23
1.7.7	The Synthesis Research of Trauner's Group	25
1.7.8	The Synthesis Research of Zakarian's Group	25
1.8	Brief Summary	26
	References	27
<b>2</b>	<b>Model Study of Maoecrystal V</b>	<b>29</b>
2.1	Model Study of Maoecrystal V: Synthesis Strategy	29
2.2	The Model Synthesis of Maoecrystal V	29
2.2.1	Pinhey Arylation	31
2.2.2	The Development and Synthetic Application of Diels–Alder Reaction	31
2.2.3	Construction of [2.2.2] System via Sequential Oxidative Dearomatization/IMDA Reaction	35
2.2.4	The Model Study of Maoecrystal V	38

2.3	Experimental Section . . . . .	48
2.3.1	Experimental Materials and Equipment . . . . .	48
2.3.2	Experimental Process and NMR Data of Model Study. . .	49
2.4	Summary . . . . .	69
	References . . . . .	70
<b>3</b>	<b>Total Synthesis of Maoecrystal V . . . . .</b>	<b>73</b>
3.1	Retro-synthetic Analysis of Maoecrystal V . . . . .	73
3.2	Strategy 1 of Total Synthesis: DA/Oxa-bridge Formation . . . .	73
3.2.1	Retro-synthetic Analysis . . . . .	73
3.2.2	The Preparation of 1,3-Keto Ester. . . . .	74
3.2.3	Diastereoselective Reduction of Ketone Carbonyl Group of 1,3-Keto Ester . . . . .	76
3.2.4	Intramolecular Diels–Alder/Oxa-bridge Strategy . . . . .	79
3.3	Oxa-bridge/IMDA: Intramolecular $S_N2$ to Form Oxa-bridge . . . .	84
3.4	Oxa-bridge/IMDA Strategy: Intramolecular Oxa-Michael Reaction . . . . .	86
3.5	Oxa-bridge/IMDA Strategy: Rh(II)-catalyzed Intramolecular O–H Insertion . . . . .	89
3.6	The Experimental Process and NMR Data of Total Synthesis . . .	96
3.7	Summary . . . . .	134
	References . . . . .	135
<b>4</b>	<b>Summary. . . . .</b>	<b>137</b>