

Chapter 4

Summary

The total synthesis of natural product Maoecrystal V was completed by an efficient convergent strategy. In the model study of Maoecrystal V, Wessly oxidative dearomatization and IMDA reaction were considered as the key reactions to rapidly construct the tetracyclic structure of Maoecrystal V, which established the foundation for total synthesis of Maoecrystal V. Through an eight-step route with a total yield of 20 %, the model study was completed with high efficiency.

In the total synthesis of Maoecrystal V, various synthetic strategies were tried for the construction of oxa-bridge on the basis of the model research. Eventually, from the known compound 3.13, which is very simple, the *cis*-diol was successfully constructed after Pinhey arylation and selective reduction of ketone groups. Divalent rhodium was utilized to catalyze intramolecular O–H bond insertion to construct a high-tension seven-membered ring structure. Then, Wessly oxidative dearomatization/IMDA strategy was utilized to construct the key pentacyclic structure of Maoecrystal V. After 17 steps, the total synthesis of Maoecrystal V was completed with a total yield of 1.2 %.

The problem that still exists in the total synthesis of Maoecrystal V is the selectivity of intramolecular Diels–Alder reaction. In the study of the total synthesis, the intramolecular Diels–Alder reaction is carried out in 36 % yield to obtain the expected product, along with the other two by-products whose structures are different from the natural product. The way to improve the selectivity of IMDA reaction will be an issue in the follow-up research.

After completing the total synthesis of racemic natural product Maoecrystal V, the asymmetric total synthesis of (-)-Maoecrystal V was carried out in our group. At this moment, the asymmetric total synthesis of (-)-Maoecrystal V has been completed, and this part of work will be introduced by other members of our group.