Total Synthesis of Natural Products with Bridged Ring Systems

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Developing efficient reactions for achieving bridged ring systems is a long-standing challenge but very significant in organic chemistry, considering that such motif is widely found in natural products (such as Taxol) with significant biological activities. So far there are few general reactions available for the single-step synthesis of bridged ring systems efficiently. In 2015, we have developed the first **Type II [5+2]** cycloaddition reaction, which allows the efficient and diastereoselective construction of various highly functionalized and synthetically challenging bridged ring systems. The asymmetric total synthesis of cyclocitrinol, cerorubenic acid and vinigrol, have been accomplished via the **Type II [5+2]** cycloaddition. In 2021, we completed the concise asymmetric total synthesis of Taxol in 21 steps.