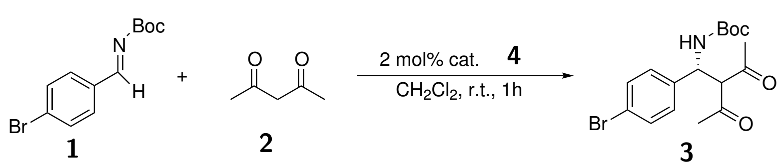
Contents

List of Schemes

1 Compound

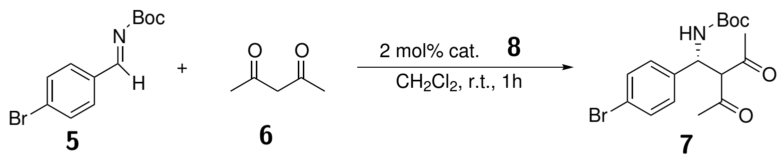


Scheme 1: Aysmmetric Mannich reaction of of N-Boc-protected imine **1** and acetyl acetone **2** in the presence of catalytic amounts of **3**.

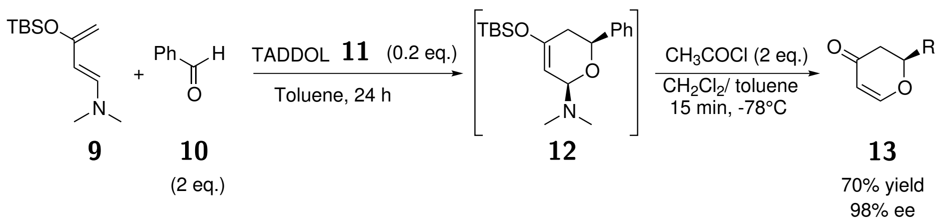
This two molecules are the starting materials **1** **2** whereas this is the catalyst **3** and this is the product **4**.

This two molecules are the starting materials **5** **6** whereas this is the catalyst **7** and this is the product **8**.

BAMOL **14** on the left and an X-Ray crystal structure of the BAMOL-benzaldehyde complex, with indicated hydrogen bonds



Scheme 2: Aysmmetric Mannich reaction of of N-Boc-protected imine **5** and acetyl acetone **6**.



Scheme 3: TADDOL catalyzed asymmetric hetero Diels-Alder reaction of diene **9** with phenylbenzaldehyde **10** to produce dihydropyrones **13**

1.1 17

Even this scheme is correct labeled the starting materials **15** the intermediate **16** and the product **17** .

1.2 Stronger chiral Brønsted acids

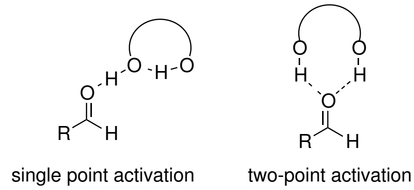


Figure 1: Point activation in which the substrates accept one or two H-bonds respectively.

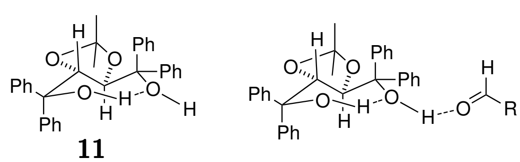
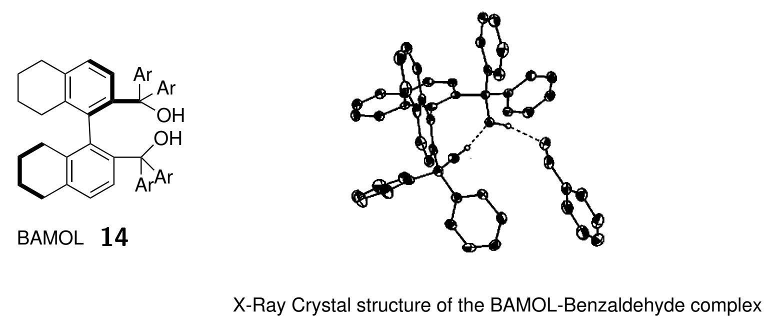
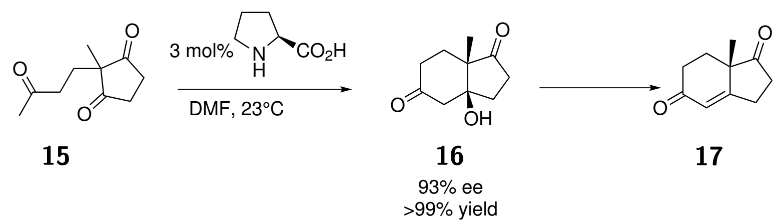


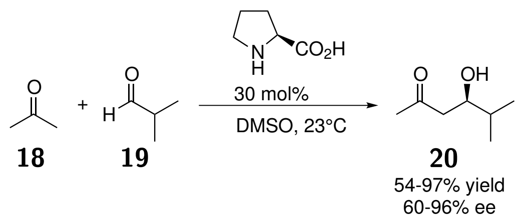
Figure 2: Structure of TADDOL in its solid state and the proposed activation mode for the Diels-Alder reaction.



Scheme 4: BAMOL **14** on the left and an X-Ray crystal structure of the BAMOL-benzaldehyde complex, with indicated hydrogen bonds.



Scheme 5: Proline catalyzed intramolecular aldol cyclization leading to diketone **17**.



Scheme 6: Proline catalyzed direct aldol reaction between acetone **18** and isubutyraldehyde .

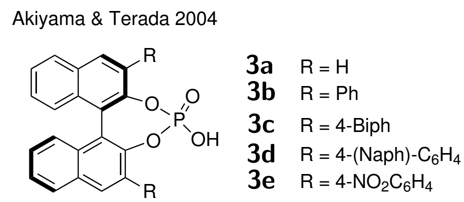
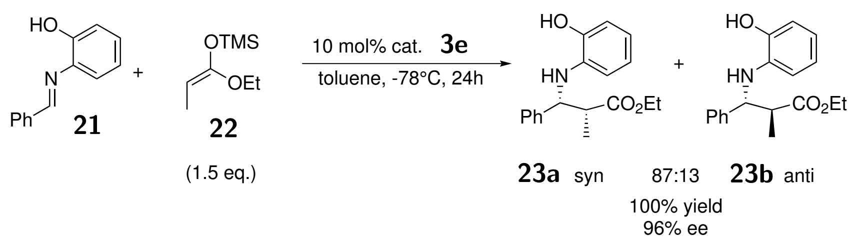


Figure 3: BINOL phosphoric acid derivatives



Scheme 7: Dia-and enantioselective Mannich-type reaction of N-protected imine **21** with silyl enolate **22**.

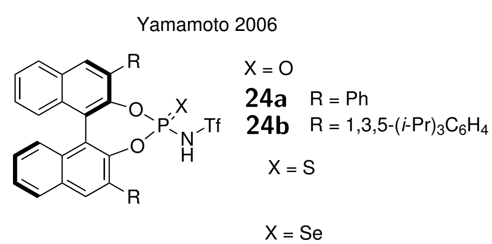
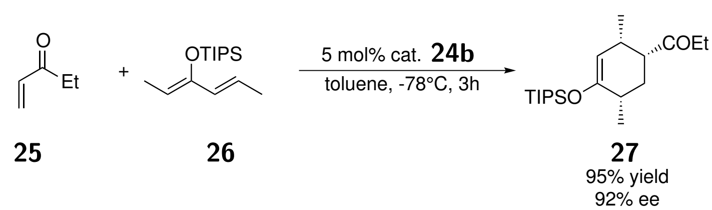


Figure 4: *N*-triflyl phosphor amides, a more acidic family of chiral Brønsted acids.



Scheme 8: Asymmetric Diels-Alder reaction of alfa beta-unsaturated ketone **25** with TIPS enol **26** catalyzed by **24b**.