Asymmetric Hydrogenation of α,α′-Disubstituted Cycloketones through Dynamic Kinetic Resolution: An Efficient Construction of Chiral Diols with Three Contiguous Stereocenters


Ruthenium-Catalyzed Dynamic Kinetic Resolution of Cycloketones

**Significance:** A ruthenium-catalyzed hydrogenation of racemic, diastereomeric α′-aryl cycloketones is reported. The reaction is a dynamic kinetic resolution (DKR) and gives chiral diols with high yield and enantocontrol in hydrogenation is a challenging feat. The DKR sets the α,α′-stereocenters and hydrogenates the ketone. When R1 is an ester, lactonization occurs and the lactone is hydrogenated to the diol. The α′-aryl substituent is essential in the DKR.

**Comment:** As the substrate consists of a mixture of four stereoisomers, exerting enantocontrol in hydrogenation is a challenging feat. The DKR sets the α,α′-stereocenters and hydrogenates the ketone. When R1 is an ester, lactonization occurs and the lactone is hydrogenated to the diol. The α′-aryl substituent is essential in the DKR. The synthetic utility of the DKR is demonstrated in the synthesis of (+)-γ-lycorane.

**Selected examples:**

<table>
<thead>
<tr>
<th>R1</th>
<th>R2</th>
<th>Yield</th>
<th>ee</th>
</tr>
</thead>
<tbody>
<tr>
<td>H</td>
<td>CH2OBn</td>
<td>92%</td>
<td>96%</td>
</tr>
<tr>
<td>CH2OBn</td>
<td>96%</td>
<td>96%</td>
<td></td>
</tr>
<tr>
<td>CO2Et</td>
<td>CH2OH</td>
<td>92%</td>
<td>96%</td>
</tr>
<tr>
<td>amide</td>
<td></td>
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</tbody>
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