Silver-Catalyzed [3+2] Cyclization of α-Imino Esters with Isocyanoacetate

**Significance:** The authors present a double [3+2] cyclization of α-amino esters with isocyanates to produce highly functionalized oxazole-imidazoles. Therefore, a silver oxide quinine derived amino phosphine ligand was used. For the pioneering work regarding isocyanates using a gold catalyst, see: Y. Ito, M. Sawamura, T. Hayashi *J. Am. Chem. Soc.* 1986, 108, 6405–6406.

**Comment:** Kinetic studies identified two cyclization processes to be step-wise. The intermediates, mono-[3+2] cyclization products, were isolated. The products can be hydrolyzed to yield functionalized α,β-diamino esters.

**Selected examples:**

<table>
<thead>
<tr>
<th>Reaction</th>
<th>Yield (%)</th>
<th>ee (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>99% yield, 98% ee</td>
<td>61% yield, 99% ee</td>
<td>76% yield, 95% ee</td>
</tr>
</tbody>
</table>

**Synthesis of the α,β-diamino ester:**

1. Ag₂O (10 mol%), ligand (20 mol%) THF, –20 °C, 24 h
2. then CN⁻CO₂Me 0 °C, 12 h; 24 °C, 12 h

92% yield, dr > 20:1, 99% ee

95% ee 90% yield, 96% ee