Highly Diastereo- and Enantioselective Silver-Catalyzed Double [3+2] Cyclization of \( \alpha \)-Imino Esters with Isocyanoacetate


**Silver-Catalyzed [3+2] Cyclization of \( \alpha \)-Imino Esters with Isocyanoacetate**

- **Significance:** The authors present a double [3+2] cyclization of \( \alpha \)-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 \( \alpha, \beta \)-diamino esters.

**Selected examples:**

- 99% yield, 98% ee
- 61% yield, 99% ee
- 76% yield, 95% ee
- 69% yield, 37% ee

**Isolation of intermediates and three-component reaction:**

- 92% yield, \( \text{dr} > 20:1 \), 99% ee

**Synthesis of the \( \alpha, \beta \)-diamino ester:**

- 95% ee 90% yield, 96% ee