**Copper-Catalyzed Asymmetric Ring Opening of D–A Cyclopropanes**

**Significance:** The authors report a copper-catalyzed enantioselective ring-opening reaction of donor–acceptor cyclopropanes with water. A variety of ring-opening products were obtained in high yields (≤96%) and enantioselectivities (≤95% ee).

**Comment:** In this reaction, the copper hydrate serves as both a Lewis acid and a source of water; this affords a system for the controlled release of the appropriate amount of water as a nucleophile in the asymmetric catalysis. The method provides a new and efficient approach for direct access to γ-substituted γ-hydroxybutyric acid derivatives.

**Selected examples:**

\[
\begin{align*}
\text{MeO} & \quad \text{95% yield, 93% ee} \\
\text{MeO} & \quad \text{70% yield, 95% ee} \\
\text{Ph} & \quad \text{95% yield, 87% ee} \\
\text{BocN} & \quad \text{95% yield, 87% ee}
\end{align*}
\]

**Effect of the water loading:**

- "excessive amount of water"
  \[
  \begin{align*}
  \text{H}_2\text{O (5.0 equiv)} & \quad \text{Cu(OTf)}_2 (10 \text{ mol\%}) \\
  \text{DME, r.t.} & \quad \text{PMP} \quad \text{OH} \quad \text{CO}_2(2-\text{Ad}) \\
  \text{91% yield, 66 18O%}
  \end{align*}
  \]

- "appropriate amount of water"
  \[
  \begin{align*}
  \text{Cu(ClO}_4)_2 \cdot 6\text{H}_2\text{O (15 mol\%)} & \quad \text{DME, r.t.} \\
  \text{PMP} \quad \text{OH} \quad \text{CO}_2(2-\text{Ad}) & \quad \text{Cu(OTf)}_2 (10 \text{ mol\%}) \\
  \text{34% yield, 90% ee} & \quad \text{product not observed}
  \end{align*}
  \]

- "water free"  
  \[
  \begin{align*}
  \text{Cu(OTf)}_2 (10 \text{ mol\%}) & \quad \text{DME, r.t.} \\
  \text{PMP} \quad \text{OH} \quad \text{CO}_2(2-\text{Ad}) & \quad \text{Cu(OTf)}_2 (10 \text{ mol\%}) \\
  \text{50% yield}
  \end{align*}
  \]

- "removal of water"  
  \[
  \begin{align*}
  \text{4 Å MS} & \quad \text{Cu(OTf)}_2 (10 \text{ mol\%}) \\
  \text{DME, r.t.} & \quad \text{PMP} \quad \text{OH} \quad \text{CO}_2(2-\text{Ad}) \\
  \text{50% yield}
  \end{align*}
  \]