Asymmetric C–H Functionalization Using Chiral Cp²Co(III) Catalysis

**Significance:** This work is an important advance in catalytic C–H functionalizations for the following reasons: (1) it is the first example of asymmetric C–H functionalization using a chiral Cp²-ligand-bound Co(III) complex; (2) it outperforms competing rhodium-catalyzed methods; (3) reactions with alkyl alkenes give regioisomeric products opposite to those with rhodium complexes.

**Comment:** The authors systematically studied the effect of various substituents on the Cp² ligand in the C–H functionalization of chlorobenzamides, a benchmark for chiral CpRh(III) catalysis. The presence of the tert-butyl group greatly influences the approach of the olefin, whereas the naphthyl backbone acts to orient and align the metallocene.

**Synthesis of the cobalt complex:**

1. Co₂(CO)₈ (1.1 equiv), CO (1 atm), CH₂Cl₂, 37 °C, 6 h
2. I₂ (1.2 equiv), Et₂O, r.t., 1 h
   - 80% yield

**Selected examples:**

- **87% yield**
  - 99% ee

- **61% yield**
  - 98% ee

- **87% yield**
  - 99% ee

- **85% yield**
  - 99% ee

- **68% yield**
  - 82% ee

- **74% yield**
  - 89% ee

- **78% yield**
  - 85% ee

- **77% yield**
  - 92% ee

- **74% yield**
  - 73% ee

- **53% yield**
  - 75% ee