Cooperative Catalysis for Asymmetric Decarboxylative Cyanation

**Significance:** Chiral alkyl nitriles are synthetically valuable compounds in organic synthesis. The authors have developed an asymmetric decarboxylative cyanation of \(N\)-hydroxyphthalimide esters by cooperative photoredox and copper catalysis.

**Comment:** This catalytic decarboxylative cyanation provides enantioenriched alkyl nitriles in good yields with high enantioselectivities. The reaction can be applied in the synthesis of a key intermediate for the chiral antidepressant molecule \((R)-\text{phenibut}\).

**Selected examples:**

- 81% yield, 89% ee
- 98% yield, 87% ee
- 71% yield, 82% ee
- 77% yield, 90% ee
- 38% yield, 94% ee
- 82% yield, 93% ee
- 93% yield, 96% ee
- 88% yield, 90% ee
- 67% yield, 88% ee
- 92% yield, 92% ee
- 59% yield, 85% ee
- 79% yield, 88% ee
- 90% ee

**Application:**

- Raney Ni (10 mol%)
- \(\text{Boc}_2\text{O} (2.0 \text{ equiv})\)
- \(\text{H}_2 (20 \text{ bar})\)
- r.t., 24 h
- 92% yield, 89% ee

\((R)-\text{phenibut}\)