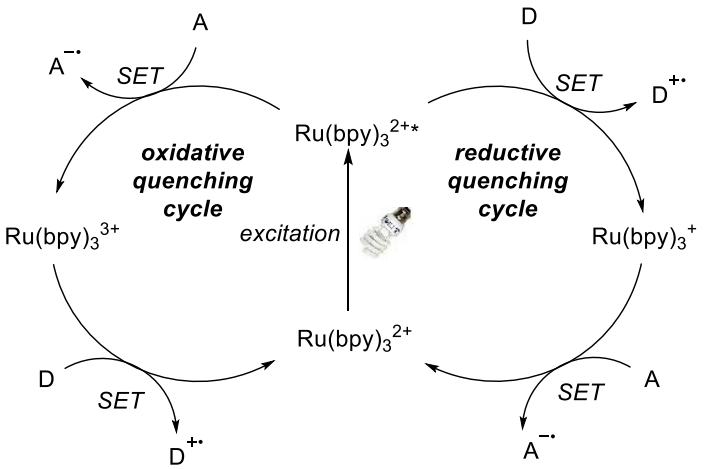
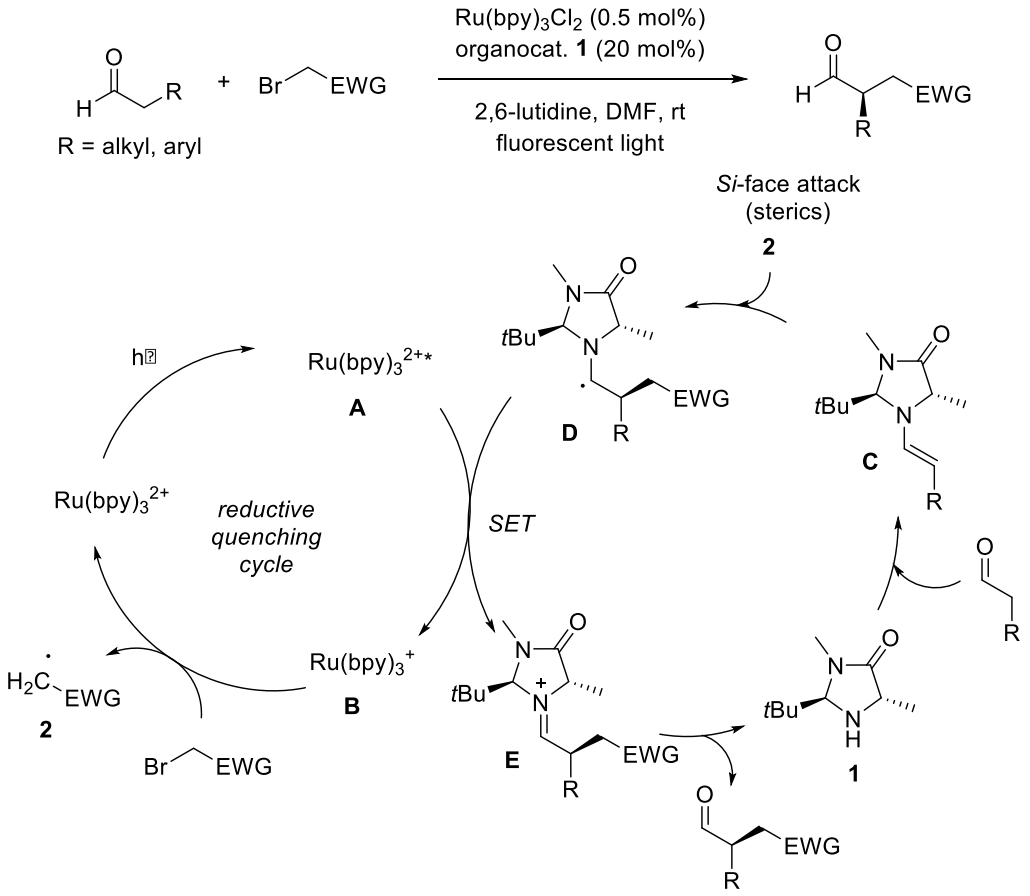
Photoredox Catalysis

Principles of Photoredox Catalysis

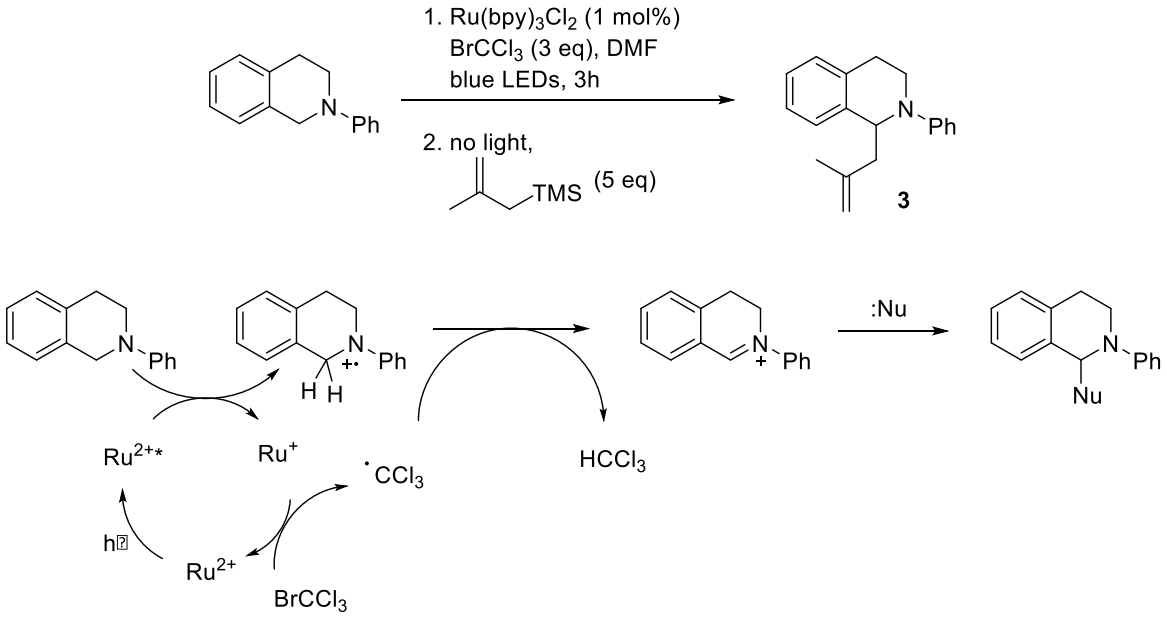


(for an informative summary, see: http://stoltz.caltech.edu/seminars/2014_Christopher.pdf
for a good review, see: Stephenson, *JOC* **2012**, *77*, 1617)

Q 1 Complete the catalytic cycle (MacMillan, *Science* **2008**, *322*, 77)
Name of catalyst: MacMillan Imidazolidinone Organocatalyst

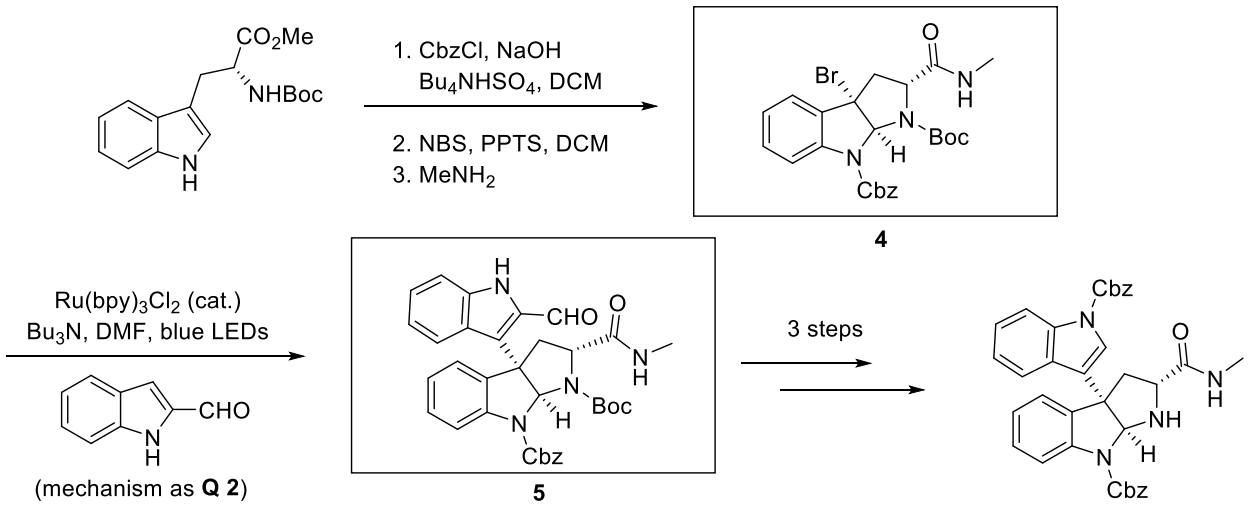


Q 2 Provide product **3** and mechanism (Stephenson, *Org Lett* **2012**, *14*, 94)
(Hint: reductive quenching cycle; $BrCCl_3$ acts as an oxidant *via* reduction of the Br–C bond)



(For a nice example of an oxidative quenching cycle, see: Stephenson, *JACS* **2011**, *133*, 4160)

Q 3 Synthesis of (+)-Gliocladin C (Stephenson, *ACIE* **2011**, *50*, 9655)
Provide products **4** and **5**



Q 4 Synthesis of (+)-Tetrabenazine (Marvin, *JOC* **2015**, *80*, 12635)

a) Give reagents and conditions for Step 1 (what is the name of this reaction?)
b) Provide products **6** and **7**
c) Provide a mechanism for the formation of **7** (Hint: reductive quenching cycle, first step: formation of R_3N radical cation)