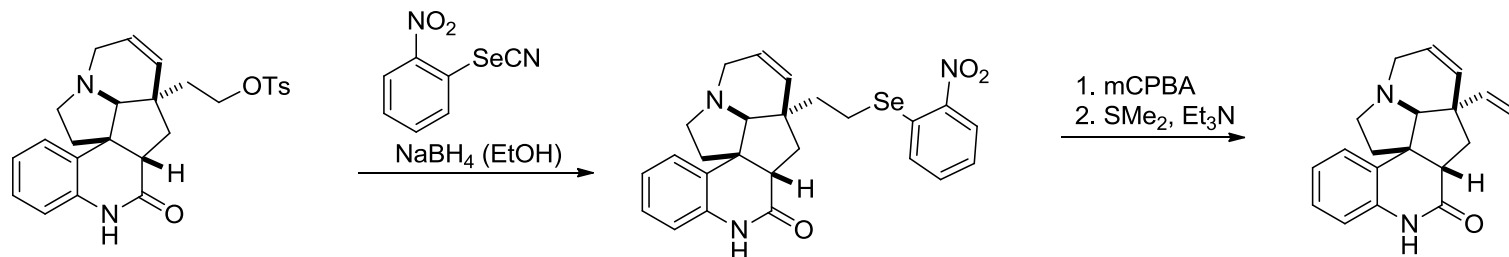
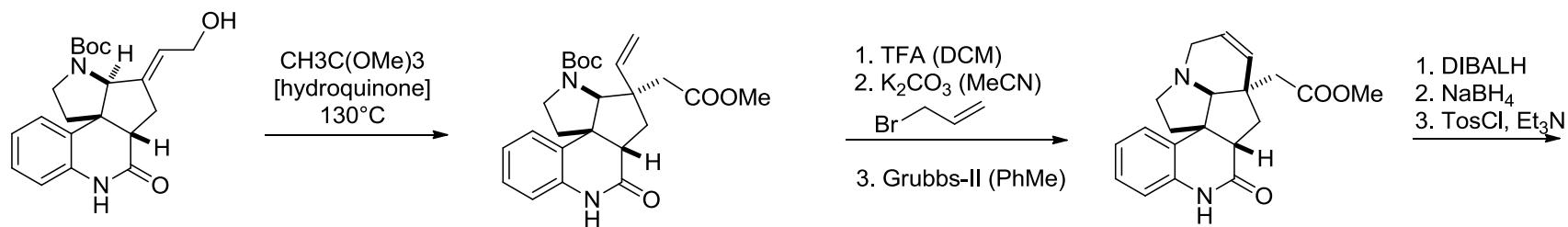
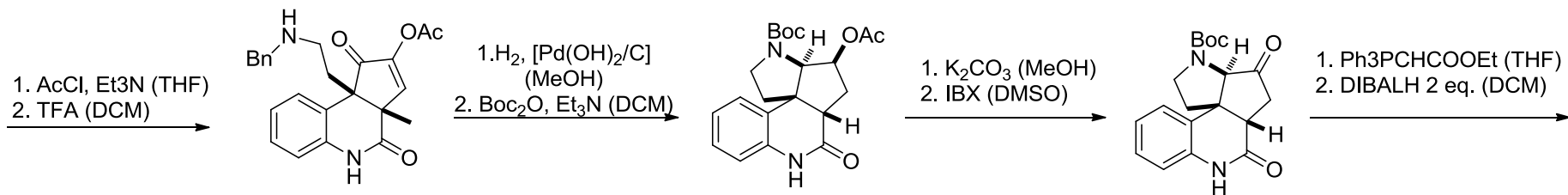
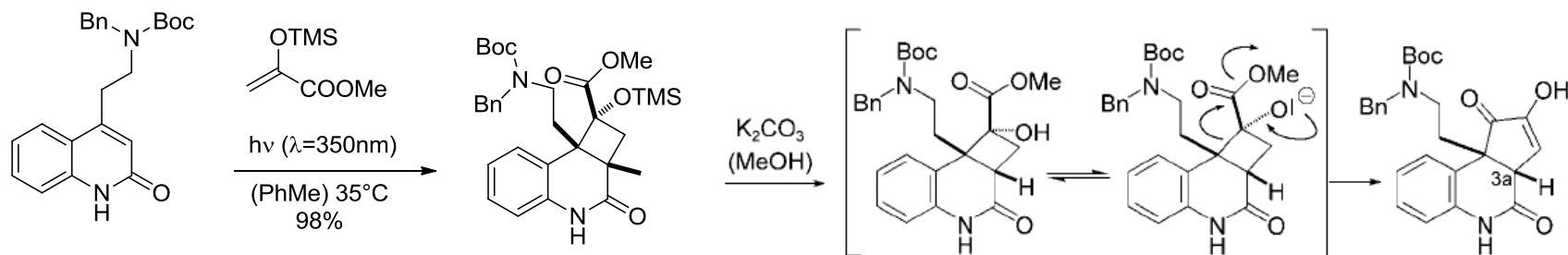


# Solution

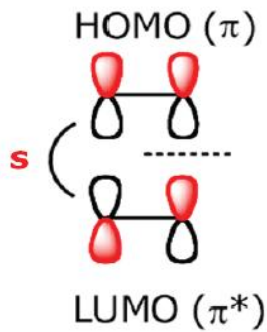


# Photochemie

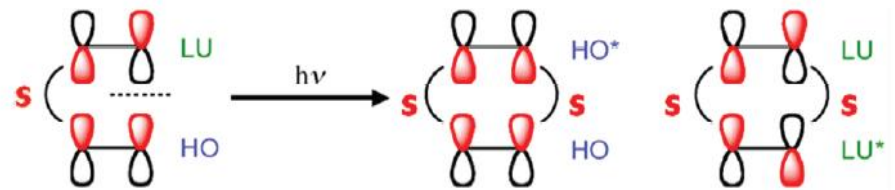
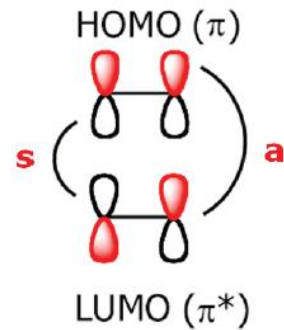
# $h\nu$ vs $\Delta T$

- Thermische  $[\pi 2\sigma + \pi 2\sigma]$ -Cycloadditionen sind Symmetrie-Verboten
- Photochemische  $[\pi 2\sigma + \pi 2\sigma]$ -Cycloadditionen sind erlaubt

→ thermisch verboten:



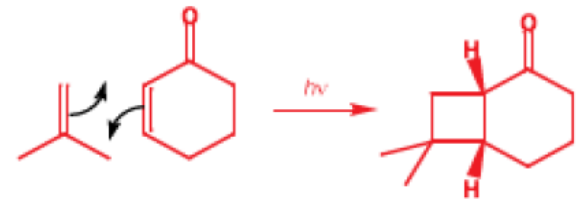
→ thermisch erlaubt:



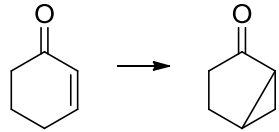
s: suprafacial, a: antarafacial

4n: disrotatorisch  
4n+2: conrotatorisch

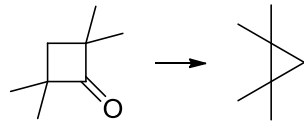
Electronenzahl ( $i + j$ )	Thermisch erlaubt	Photochemisch erlaubt
4n	s+a a+s	a+a s+s
4n + 2	a+a s+s	s+a a+s



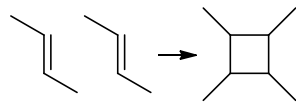
# Gängige Reaktionen



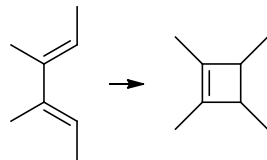
Sigmatropic Photorearrangement



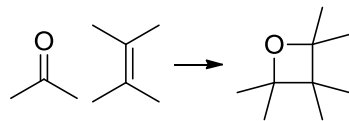
$\alpha$ - Cleavage, Norrish type I



[2+2]-Photocycloaddition



Electrocyclic photorearrangement



Paternò-Büchi

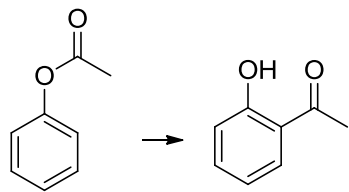
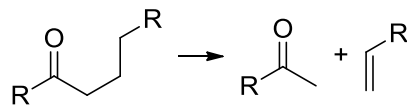


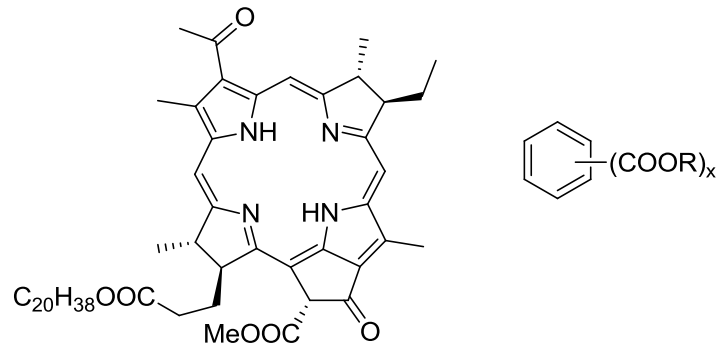
Photo-Fries rearrangement



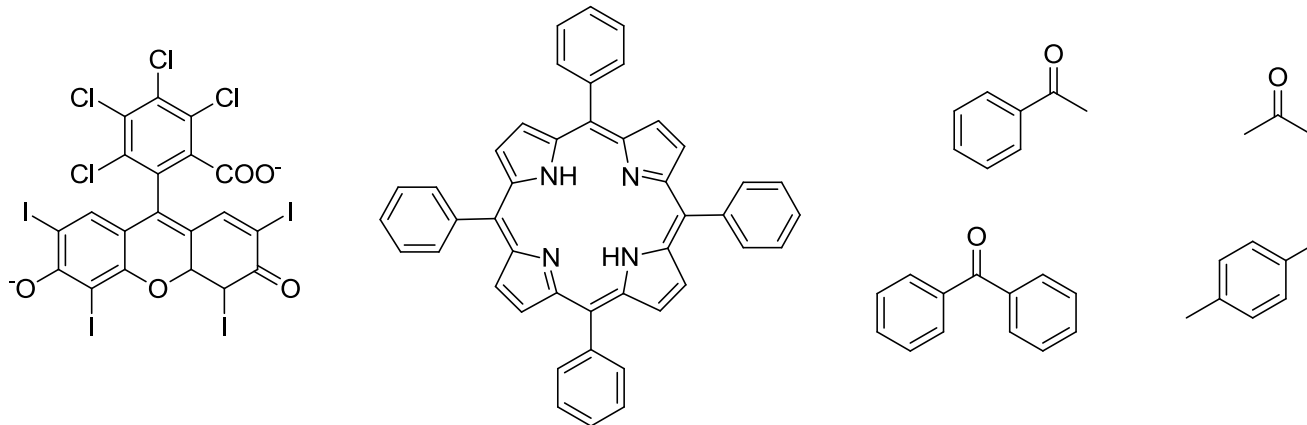
Norrish type II

# Beispiele für Photosensitizer

## Singlet Photosensitizer



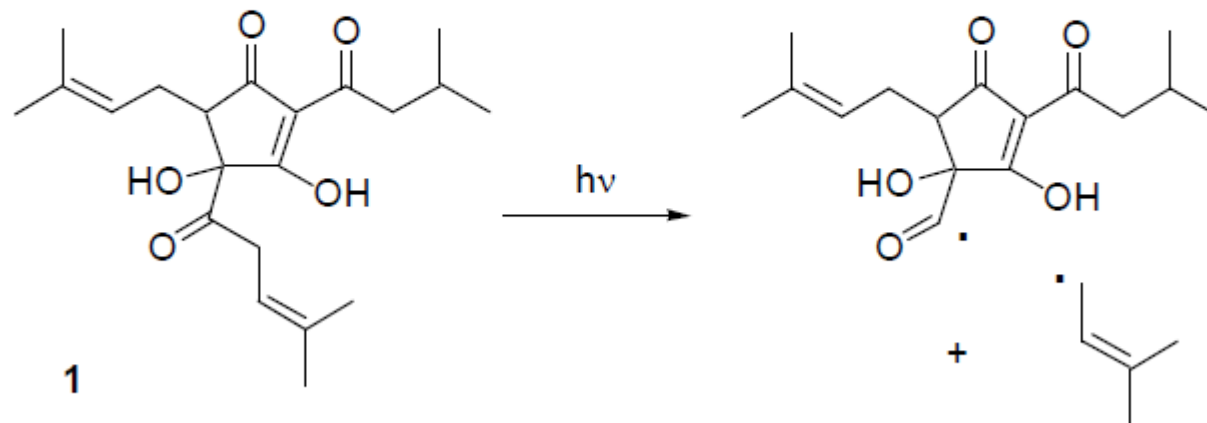
## Triplet Photosensitizer



# Warum ist Bier in dunklen Flaschen?

## LSF („light struck flavor“) im Bier

Isohumulon (**1**) ist ein wichtiger Bitterstoff des Bieres, der aus dem Hopfen stammt.



Das entstehende Allylradikal reagiert weiter mit Schwefelverbindungen unter Bildung übelriechender und –schmeckender Thiole, die vermutlich für den LSF verantwortlich sind.