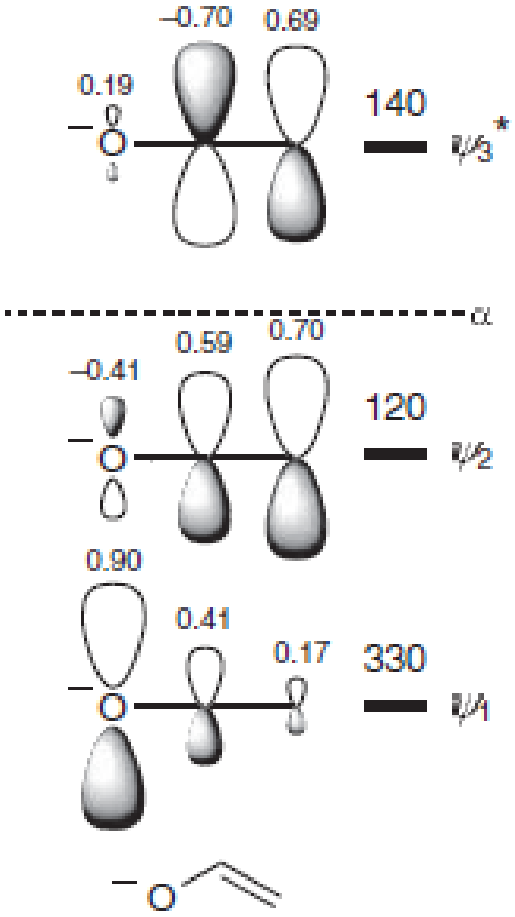
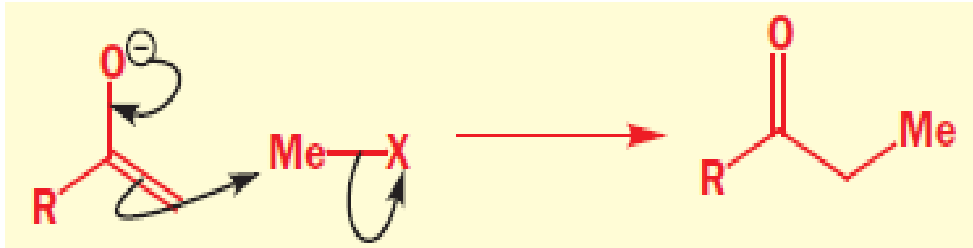
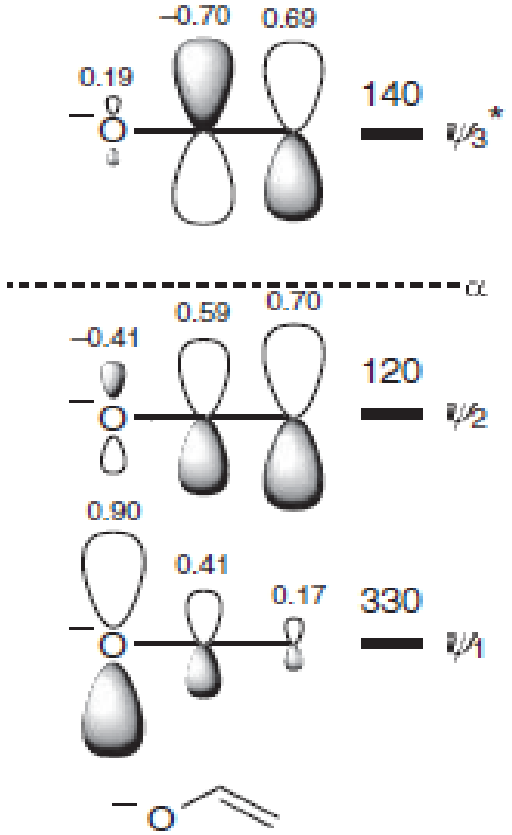
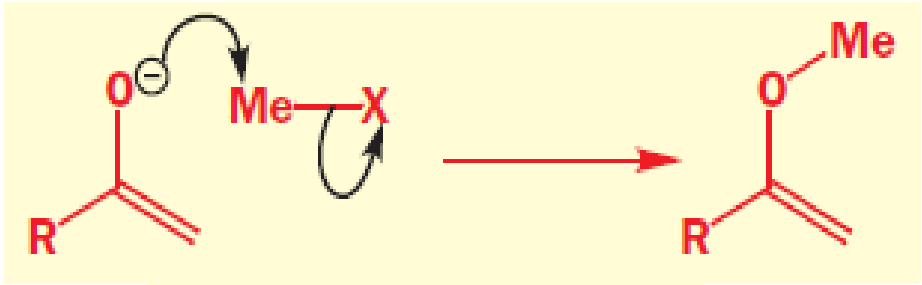



X = I, Br, Cl

❑The electron probability distribution in HOMO tells you that it would react with electrophiles through $C_\alpha$




X = OMs, $OSO_2OMe$, $^+OMe_2$

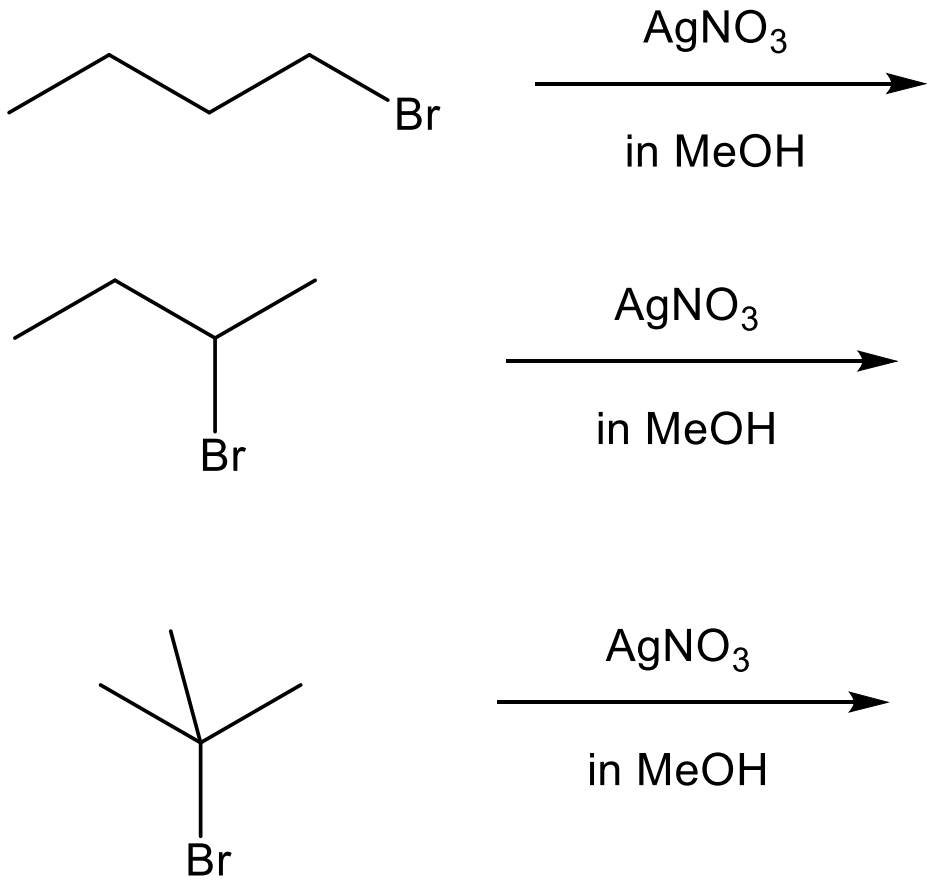
❑ But how to explain the reaction with hard electrophiles?

✓ *Hard-hard* interactions are promoted by *charge interactions*, molecular orbitals play lesser roles

✓ *Soft-soft* interactions are dominated by *molecular orbital interactions*, charge interactions are less important

# *Demo Experiments*

# $S_N1$ reaction: Primary, Secondary and Tertiary Alkyl Halide



What do you see here?

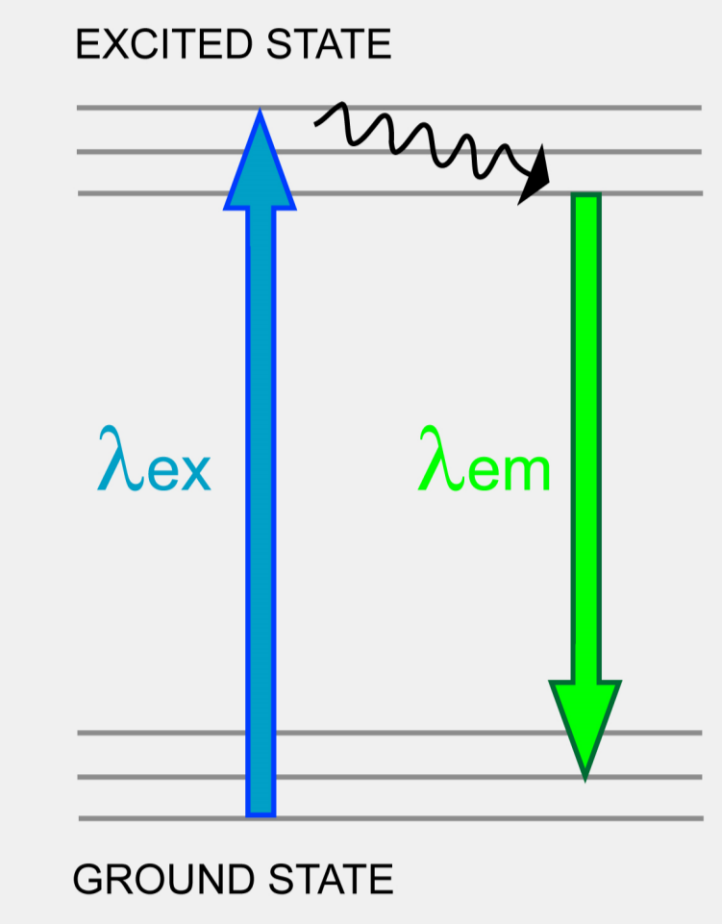
Firefly

✓This is an emission phenomenon

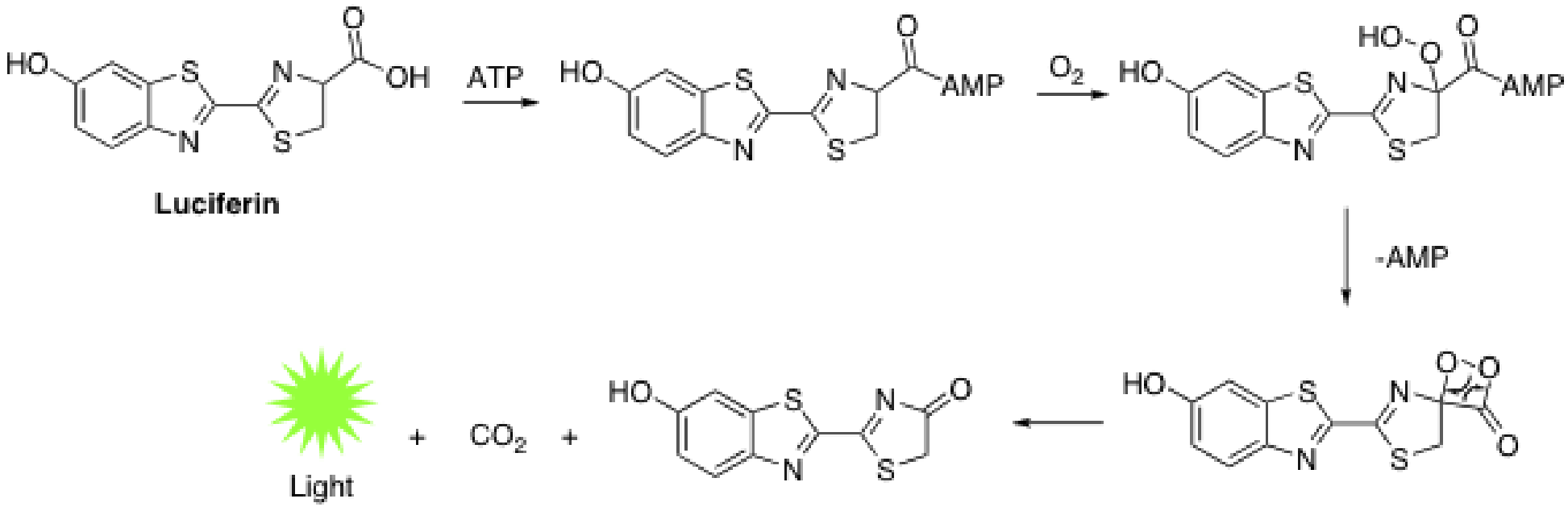
✓How do the fireflies emit light at night? There is no light source

# *Luminescence*

- Lumen/Lumin: *Latin*- meaning light



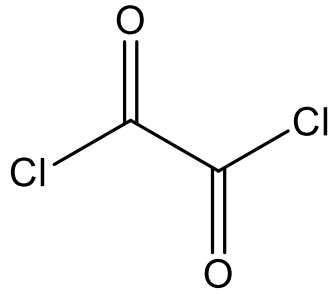
# *Chemiluminescence*




Firefly

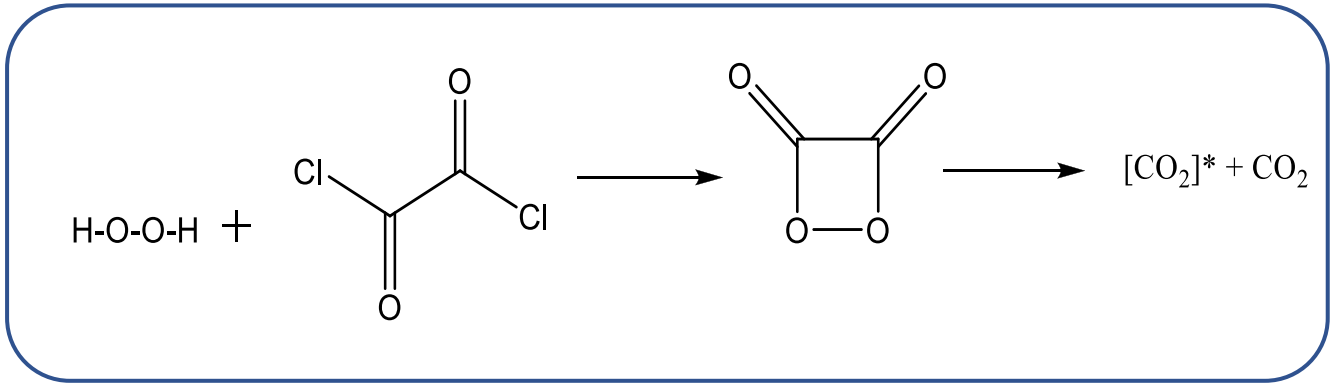
Luciferin oxidation by an enzyme

✓The dyes are mixed with oxalyl chloride and $H_2O_2$

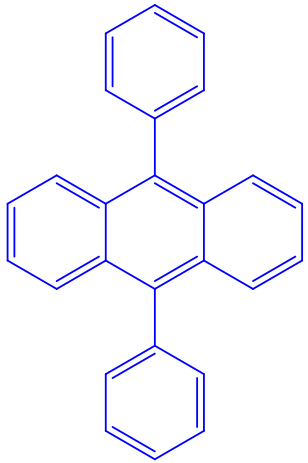



(Oxalyl Chloride)

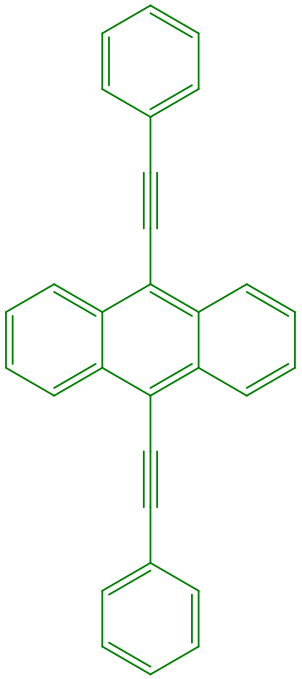
✓A chemical reaction is happening



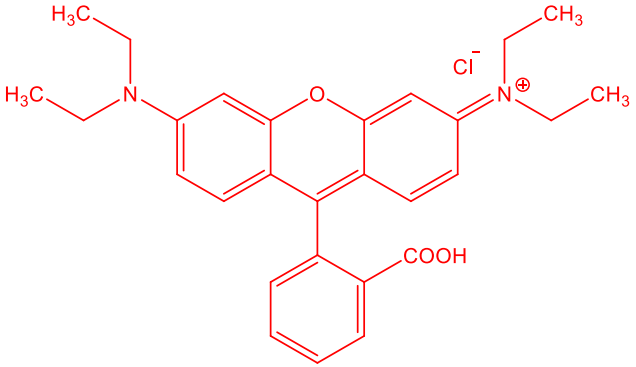
# *Chemiluminescence*



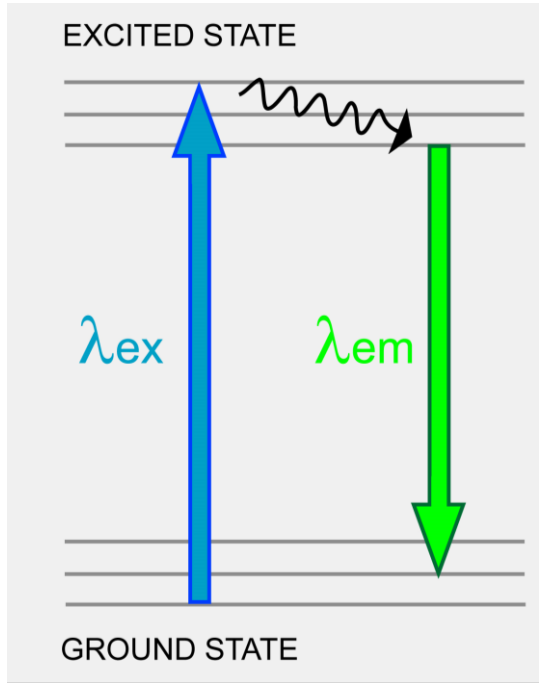
**9,10-Diphenylanthracene**



**9,10-Bis(phenylethynyl)anthracene**




**Rhodamine B**



*White light: by mixing RED, GREEN and BLUE in correct proportions*