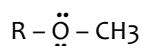
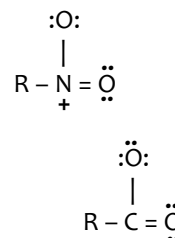


Electron-withdrawing vs. -donating?



- **H** is the standard; no effect
- **Electron-withdrawing groups**
 - atom adjacent to the π or resonant system (R) has
 - (1) several bonds to more en atoms; or
 - (2) formal positive or dipolar positive charge
 - Pulls e^- out of the system, increasing polarization and acid strength, \downarrow pKa
- **Electron-donating groups**
 - $:$ on the atom adjacent to the π or resonant system (R)
 - Except: - R, - Ar, or -vinyl
 - Pushes e^- into the system, decreasing polarization and acid strength, \uparrow pKa



Ian Hunt, Dept. Chem, U Calgary

Find your group!

