(15) **Today**

Sections 2.7 – 2.11
Acids and Bases

Lewis Acids

Section 2.12
Noncovalent Interactions Between Molecules

Next Class (16)

Section 3.1
Functional Groups

Section 3.2
Alkanes and Isomers

Section 3.3
Alkyl Groups

Section 3.4
Nomenclature

(17) **Second Class from Today**

Section 3.3 Alkyl Groups

Section 3.4 Nomenclature

Section 3.5 - 3.7 Properties and
Conformations of Alkanes

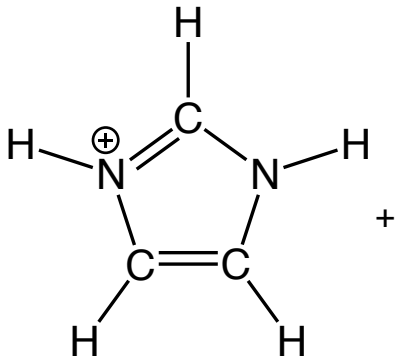
Third Class from Today (18)

Section 3.5 - 3.7 Properties and
Conformations of Alkanes

Chap 4 Cycloalkanes

nope .... Monday ... for sure

acid
proton donor



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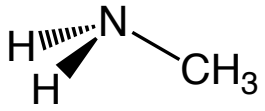
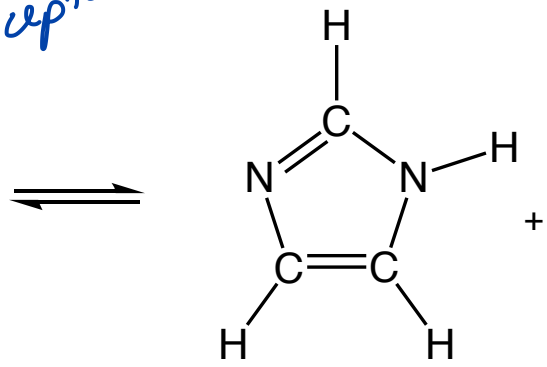
proton acceptor



base



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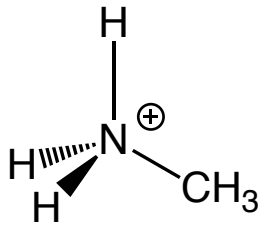


stronger acid
$pK_a = 6.95$

weaker acid
$pK_a = 10.6$

which is the stronger acid ...
the one with a pK_a of 6.95

$$pK_a = -\log K_a$$

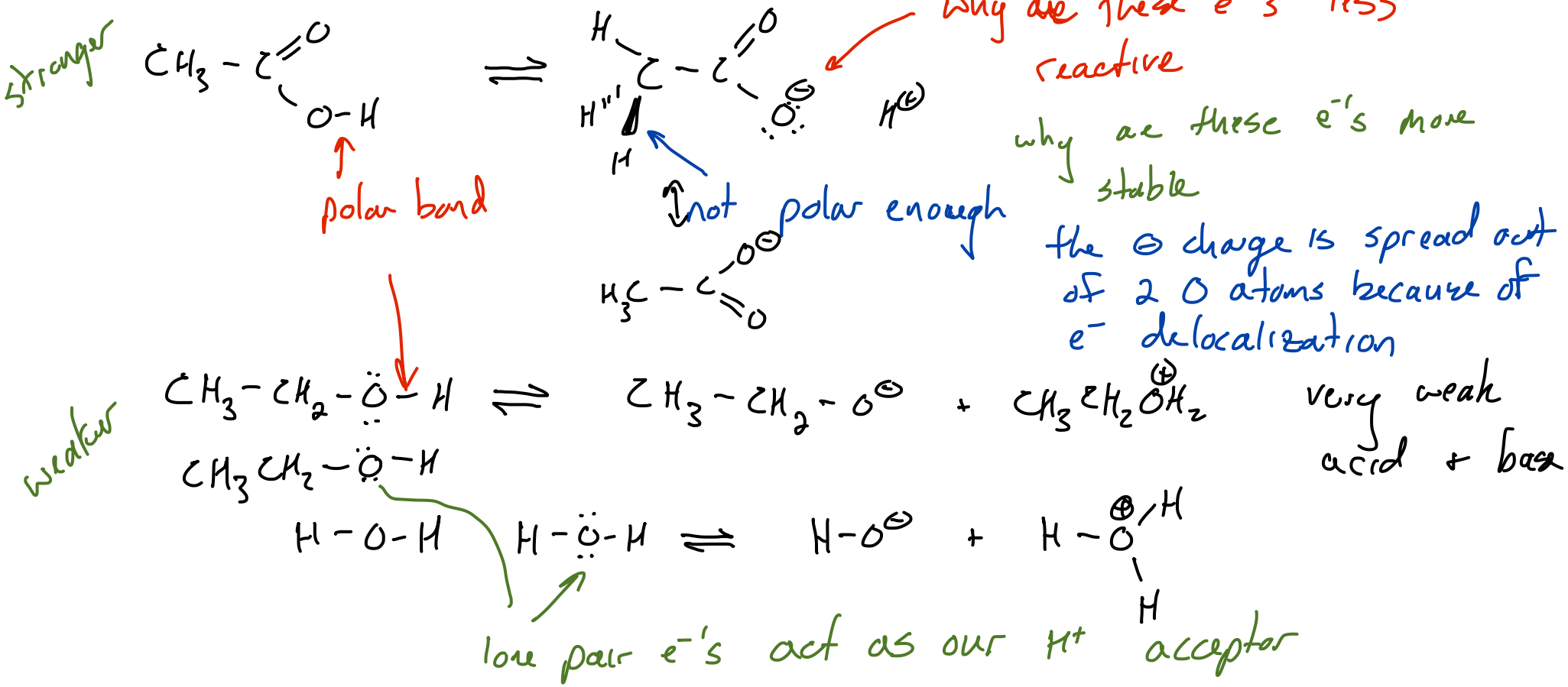
$K_a \approx 10^{-7}$

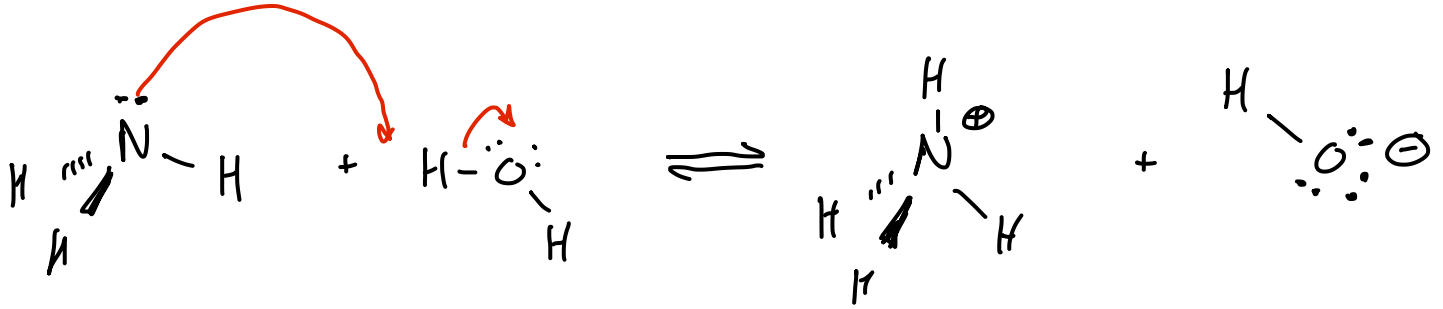
stronger acid will react to give up H^+ and make a weaker acid

$K_a \approx 10^{-11}$

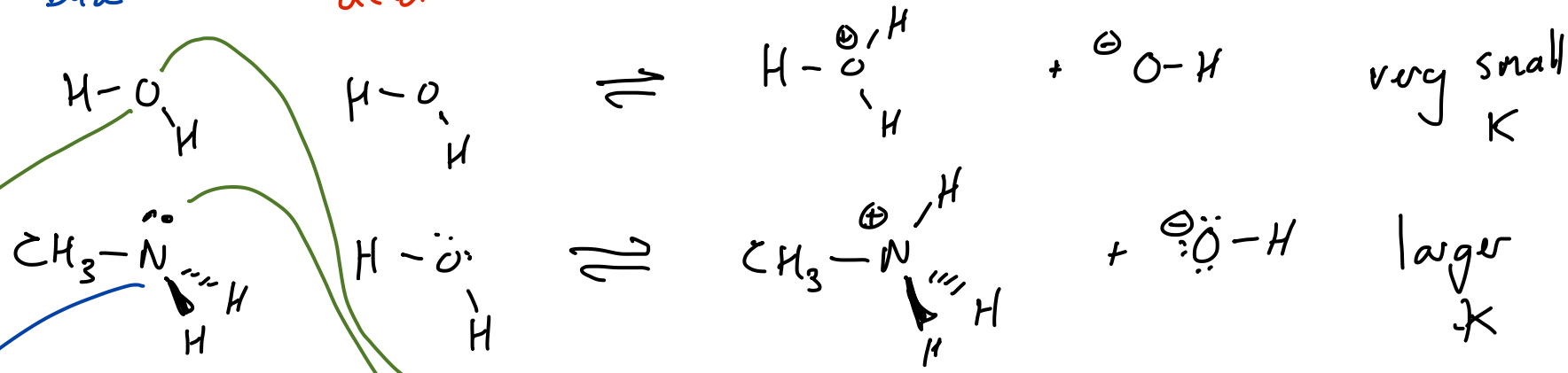
Acids are H^+ donors the lower the pka the stronger the acid.

Polar bonds are the bonds most likely to release H^+





base acid



very small K

larger K

organic amines are bases

How attractive are these e^-'s

7 ip^+ in N's nucleus. e^-'s less stable

N's electrons are less attracted to N's nucleus. Available to react with H^+

8 ip^+ in O's nucleus e^-'s are more stable

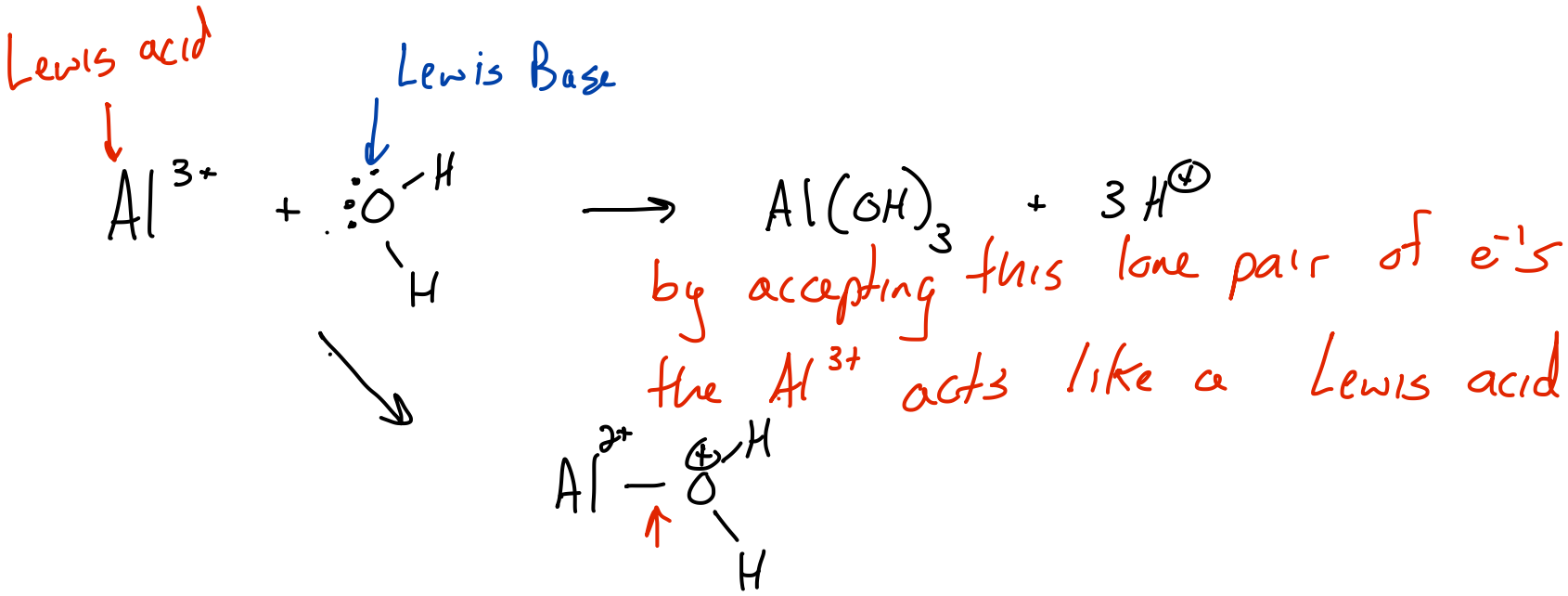
O's e^-'s are more strongly attracted to O's nucleus. less available to react with H^+

add $AlCl_3$ slowly to H_2O

$$AlCl_3(s) \xrightarrow{H_2O} Al^{3+}(aq) + 3Cl^{\ominus}(aq) \longrightarrow Al(OH)_3(aq) + HCl(aq)$$

this creates an acidic solution

$$NaCl(s) \xrightarrow{H_2O} Na^{\oplus}(aq) + Cl^{\ominus}(aq)$$

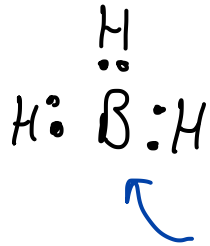


Lewis bases are lone-pair e^- donors

metals that are +2 and higher act as Lewis acid

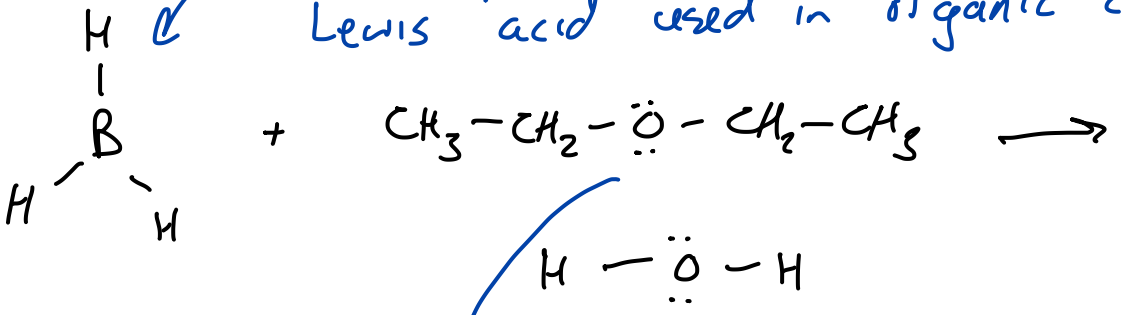
Zn^{2+}

BH_3 borane



incomplete octet ... room for 2 more e^-'s

an example of a Lewis acid used in organic chemistry



water can act like a base because the O has lone-pair e^-'s.

ether can act like a base because the O has lone-pair e^-'s.

$FC_B = 3 - (0 + 4)$

$= -1$

formal charges are a sign that this will be a reactive molecule

$FC_O = 6 - (2 + 3)$

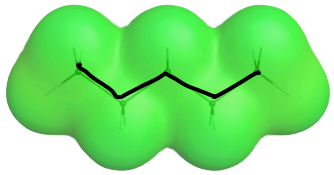
$= 1$

Oxygen is sharing more e^-'s than we would normally expect

Collectively referred to as...

intermolecular forces, van der Waals forces, or noncovalent interactions

C_5H_{12}



pentane

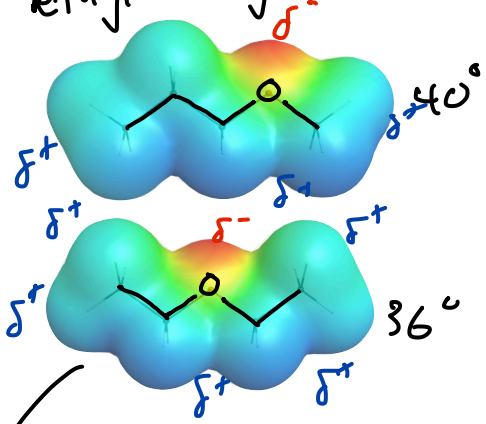
35.9 °C

low BP

weaker intermolecular forces

$C_4H_{10}O$

ethyl methyl ether



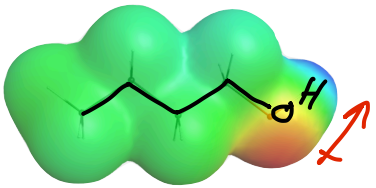
40.2 °C

36.4 °C

diethyl ether

ether

$C_4H_{10}O$



these molecules are much more

117 °C higher BP

strongly attracted to other molecules with the same structure

stronger intermolecular forces