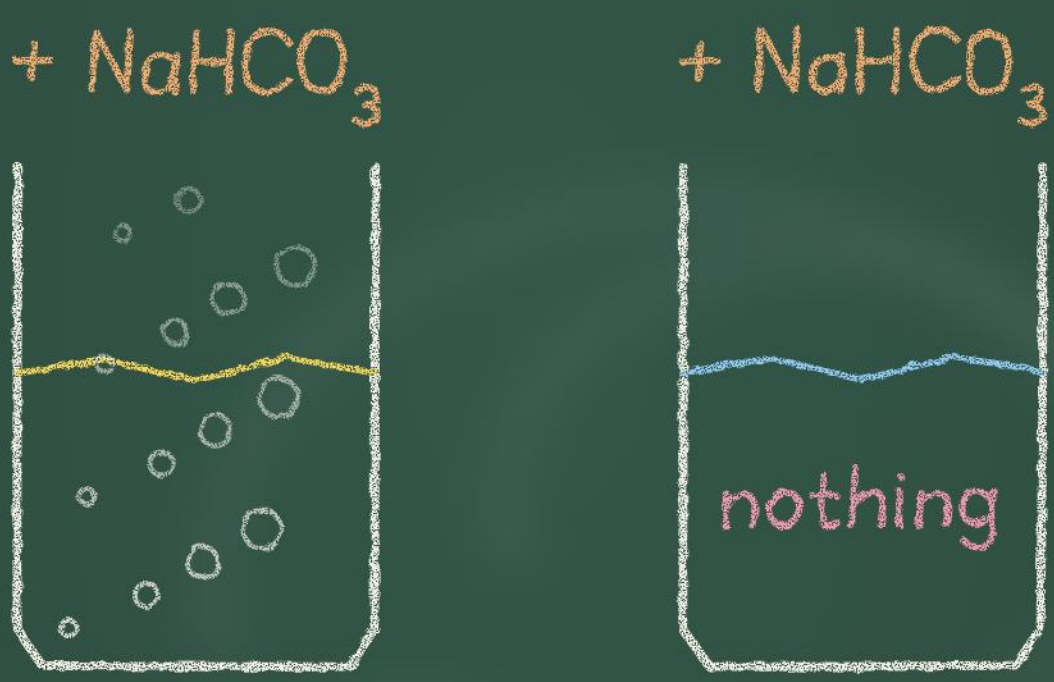
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Why Carboxylic Acids Are Acidic



$$CH_3COOH + NaHCO_3 \rightarrow CH_3COONa + H_2O + CO_2$$

why is COOH acidic?

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Why Carboxylic Acids Are Acidic



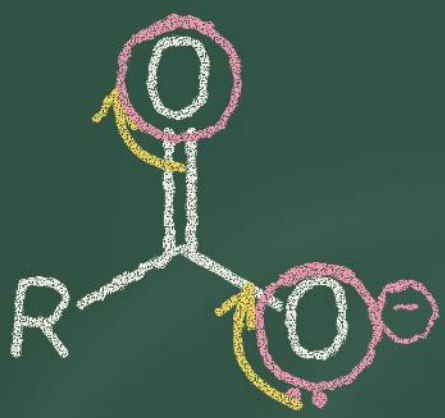
carboxylate ion

more stable ion
= stronger acid

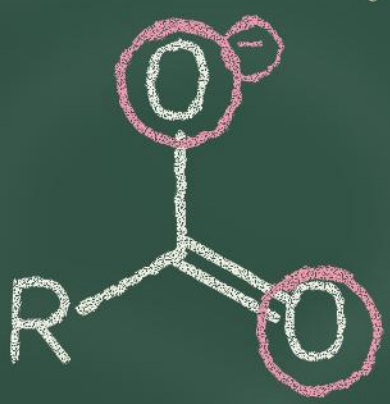
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Why Carboxylic Acids Are Acidic



↕ equal structures



both C–O bonds equal

charge shared → stable ion

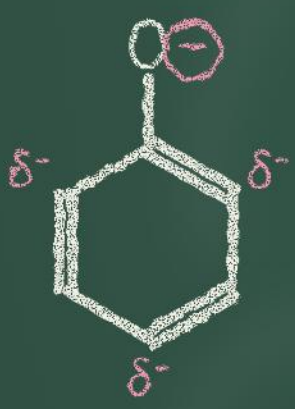
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Why Carboxylic Acids Are Acidic



over 2 equal O: best



onto ring C: weaker



stuck on 1 O: weakest

RCOOH > phenol > alcohol

pKa ≈ 4.8 10 16

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Why Carboxylic Acids Are Acidic



-I: Cl pulls electrons

CH_3COOH	pKa 4.8
$ClCH_2COOH$	pKa 2.9
$Cl_2CHCOOH$	pKa 1.3
Cl_3CCOOH	pKa 0.7

stronger

lower pKa = stronger acid

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Why Carboxylic Acids Are Acidic

remember

$RCOO^-$: charge on 2 equal O

RCOOH > phenol > alcohol

electron-pulling groups: stronger

next: acid + alcohol = fruity smell?