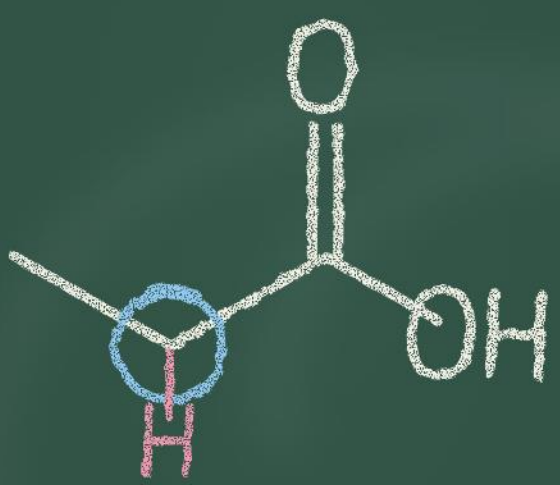
PrayogX · Chemistry

PRAYOGX

HVZ & Ring Substitution



α-carbon

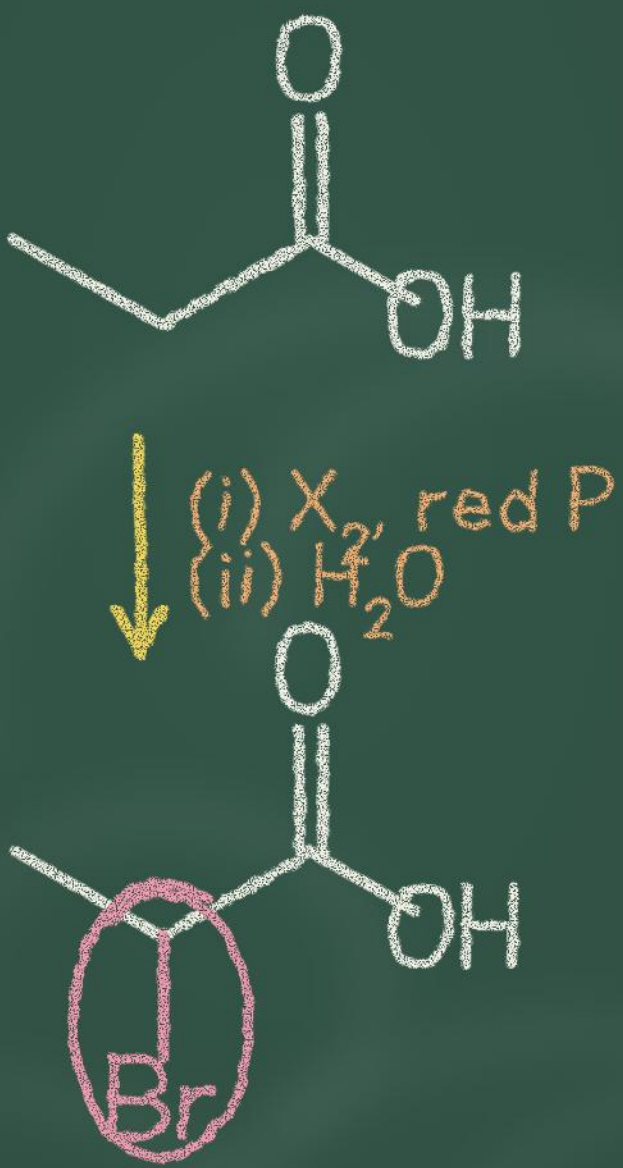
α-H → X ?

Hell-Volhard-Zelinsky (HVZ)

PrayogX · Chemistry

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HVZ & Ring Substitution



α-halo acid

$$R\text{-}CH_2\text{-}COOH \rightarrow R\text{-}CHX\text{-}COOH$$

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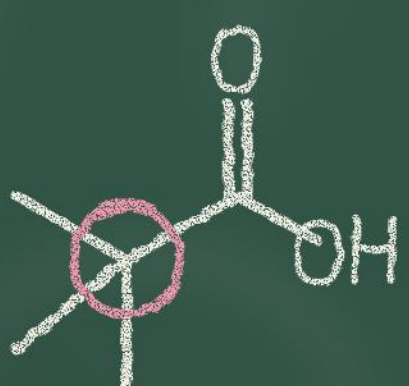
PRAYOGX

HVZ & Ring Substitution

needs at least one α-H

$$CH_3COOH \xrightarrow{Cl_2,\ red\ P} ClCH_2COOH$$

chloroacetic acid



no α-H: no HVZ

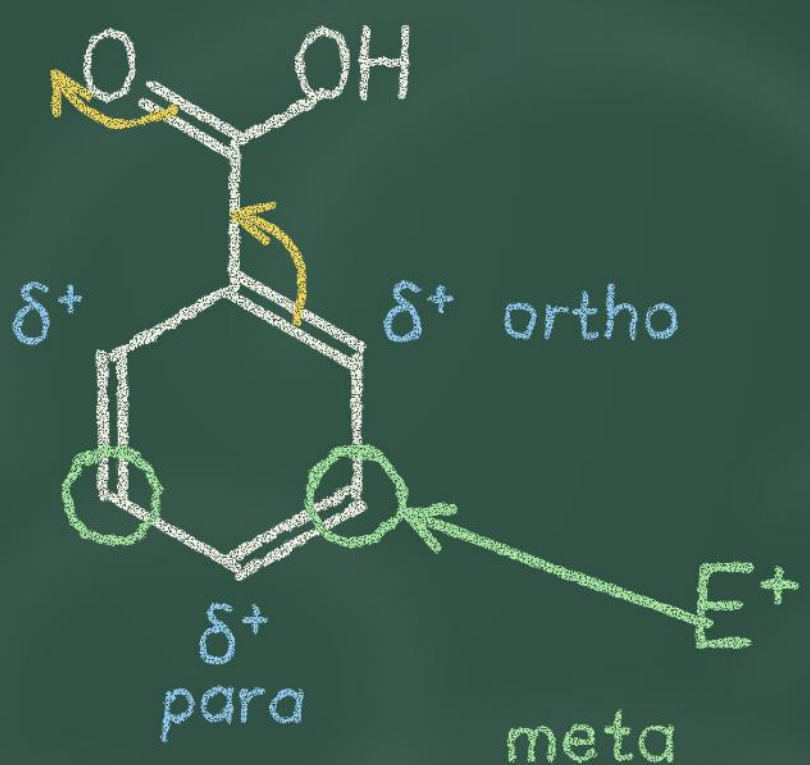
α-halo acids: useful starting materials

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PRAYOGX

HVZ & Ring Substitution

benzoic acid



COOH pulls ring electrons

HNO_3 / H_2SO_4 → m-nitrobenzoic acid

Br_2 / $FeBr_3$ → m-bromobenzoic acid

COOH: deactivating, meta-directing

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PRAYOGX

HVZ & Ring Substitution

Friedel-Crafts?

$C_6H_5COOH + RCl \,/\, AlCl_3$

no reaction

1. ring deactivated by COOH
2. $AlCl_3$ binds to the COOH

$C{=}O: \rightarrow AlCl_3$

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PRAYOGX

HVZ & Ring Substitution

remember

HVZ: X_2 + red P

α-H → α-X

ring COOH: meta-directing

no Friedel-Crafts

next: acids in daily life