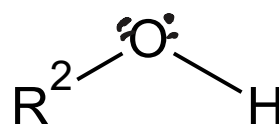
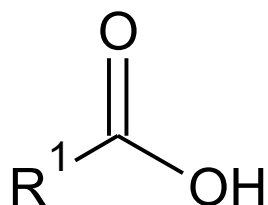
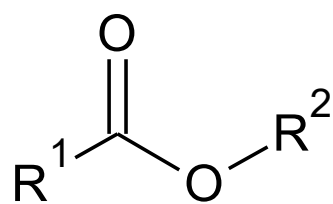


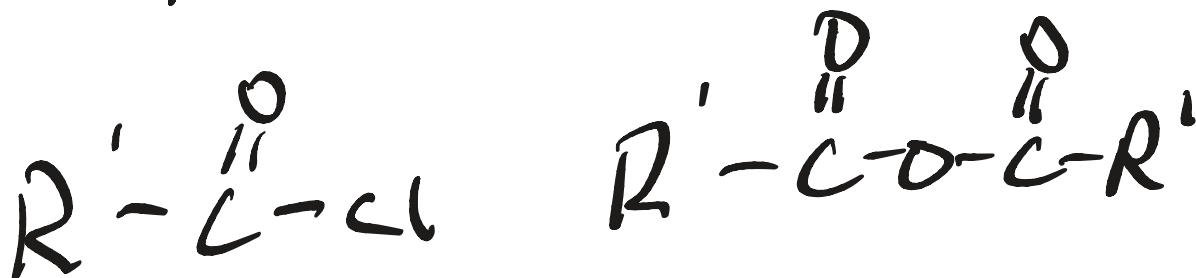
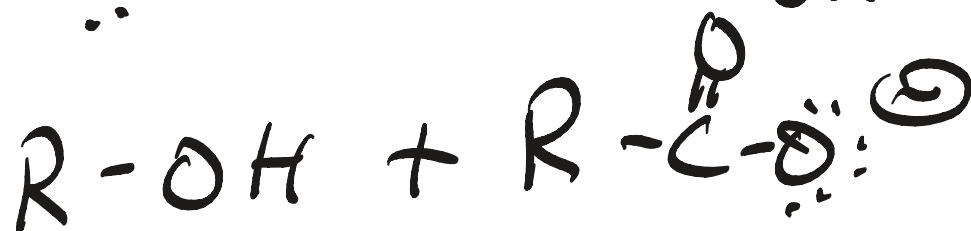
Fischer Esterification

220 C

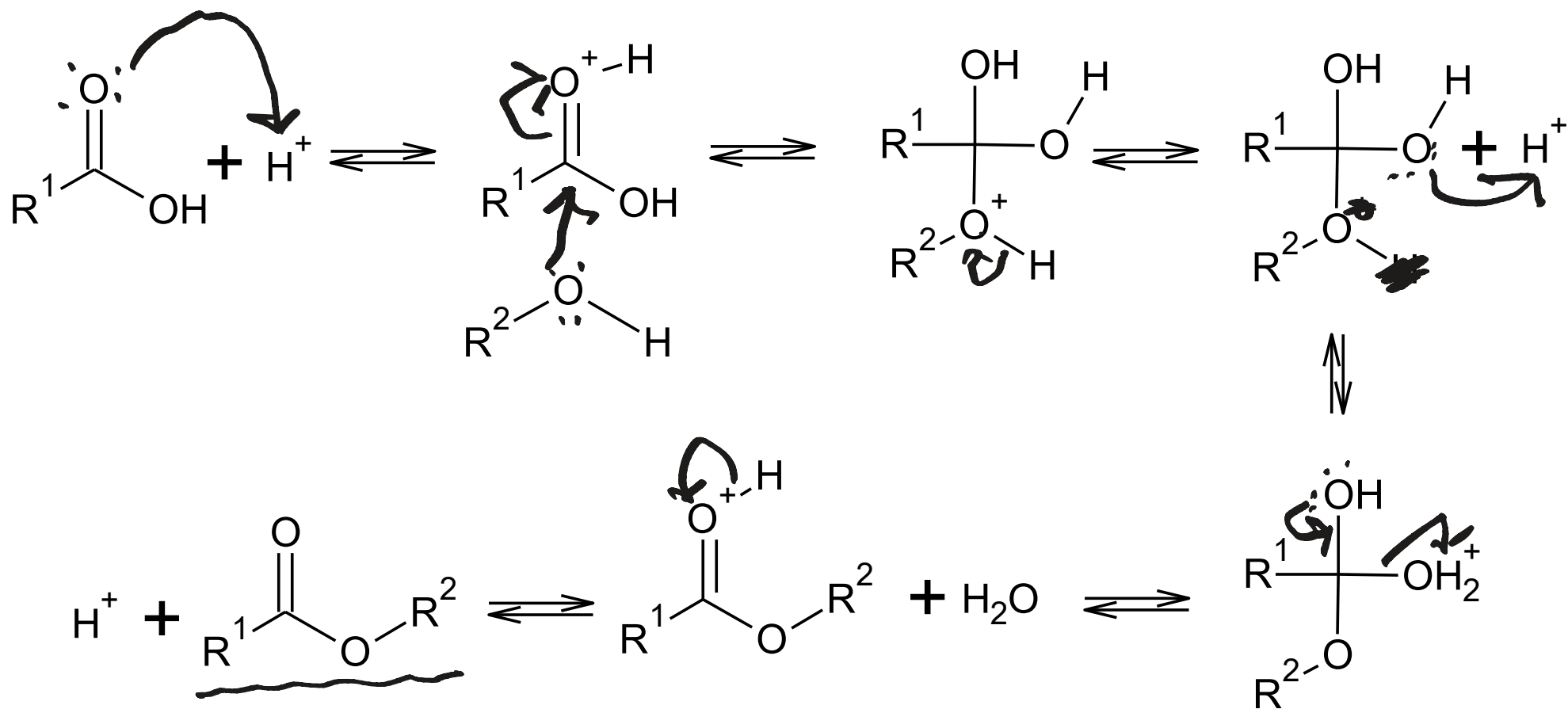
7/27/26



1. Supply energy
2. Lower activation energy



Fischer esterification



1. H^+ source H_2SO_4
2. equilibrium problem

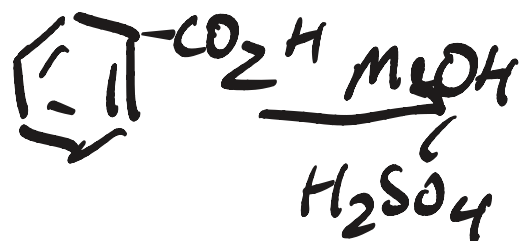
$$K_{eq} = \frac{\text{Prod}}{\text{react}} = \frac{[H_2O][\text{Ester}]}{[\text{acid}][\text{alcohol}]}$$

$$\approx 4 = \frac{x \cdot x}{(1-x)(1-x)} = \frac{x^2}{(1-x)^2}$$

$$2 = \frac{x}{1-x} \Rightarrow x = \frac{2}{3} \quad 67\%$$

$$4 = \frac{x^2}{(1-x)(2-x)} \Rightarrow \begin{aligned} 2x &\sim 85\% \\ 3x &\sim 91\% \end{aligned}$$

3. no products at beginning



reflux

H₂SO₄

in

% yield 65

IR

GL

30-50

✓

