

Add HCl: proton donor $\uparrow H^+$ shift backward

more H^+ in more color (1)

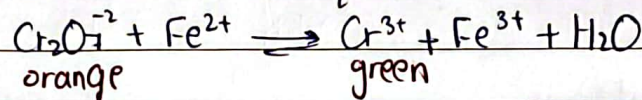
less Cr^{3+} less color (2)

Add NaOH: proton acceptor $\downarrow H^+$ shift forward

more Cr^{3+} more color (2)

less H^+ less color (1)

Q. The reversible reaction below at equilibrium:



→ Explain by adding HCl to the rxn mixture the color of the mixture becomes green?

→ HCl is an acid (proton donor)

→ more H^+

→ shift forward

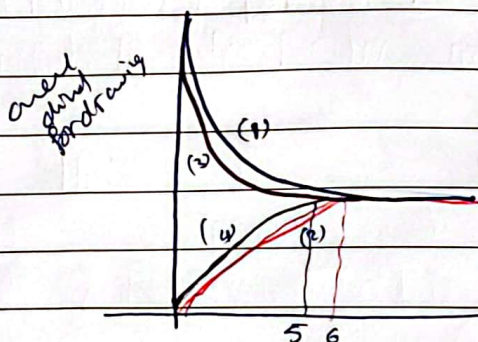
→ more Cr^{3+} more green

→ less $Cr_2O_7^{2-}$ less orange

* Catalyst:

has no effect on the position of equilibrium

since it speeds up the rate of forward + backward.



(1) → rate of forward reaction without catalyst

(2) → " " backward " " " "

(3) → " " forward with catalyst

(4) → " " backward " " " "

(5) → time taken to reach equil with catalyst

(6) → " " " " " " without catalyst