PH VAN ZUREN

Sterk zuur	**Zwak zuur**	**Zeer zwak zuur**
$\alpha = 1$	$\alpha < 1$	$\alpha \approx 0$
$HCl + H_2O \rightleftharpoons H_3O^+ + Cl^-$ Evenwicht naar rechts	$HAc + H_2O \rightleftharpoons H_3O^+ + Ac^-$	$HCN + H_2O \rightleftharpoons CN^- + H_3O^+$ Evenwicht naar links
$[H_3O^+] = [Cl^-] = C_{HCl}$	$[Ac^-] = [H_3O^+] = \alpha \, . \, C_A$	$[HCN] \approx C_A$
	$\alpha^2 C_A + K_a\alpha - K_a = 0$	$[H_3O^+] = \sqrt{K_a C_A}$
$pH = -\log(C_{HCl})$	$pH = -\log(\alpha.C_A) =$ $-\log\left(\frac{-K_a+\sqrt{K_a^2+4K_aC_A}}{2}\right)$	$pH = -\log(\alpha.C_A)$ $= -\log(\sqrt{K_aC_A})$ $= ½\ pK_a - ½\ \log C_A$

PH VAN BASEN

Sterke base	**Zwakke base**	**Zeer zwakke base**
$\beta = 1$	$\beta < 1$	$\beta \approx 0$
$NaOH \rightleftharpoons Na^+ + OH^-$ evenwicht naar rechts	$B + H_2O \rightleftharpoons BH^+ + OH^-$	$B + H_2O \rightleftharpoons BH^+ + OH^-$ Evenwicht naar links
$[OH^-] = C_B$	$[BH^+] = [OH^-] = \beta.C_B$	$[B] \approx C_B$
	$\beta^2 C_B + K_b\beta - K_b = 0$	$[OH^-] = \beta.C_B = \sqrt{K_b/C_B}.C_B$ $= \sqrt{K_b.C_B}$
$pOH = -\log([OH^-])$ $= -\log C_B$	$pOH = -\log(\beta.C_B)$ $= -\log\left(\frac{-K_b+\sqrt{K_b^2+4K_bC_B}}{2}\right)$	$pOH = -\log(\beta.C_B)$ $= -\log(\sqrt{K_bC_B})$ $= ½\ pK_b - ½\ \log C_B$
$pH = pK_w - pOH$	$pH = pK_w - pOH$	$pH = pK_w - pOH$
$pH = pK_w + \log(C_B)$	$pH = pK_w + \log\left(\frac{-K_b+\sqrt{K_b^2+4K_bC_B}}{2}\right)$	$pH = pK_w - ½\ pK_b + ½\ \log C_B$