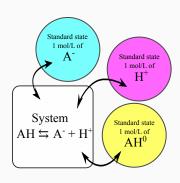
Grand-reaction ensemble.



Moderate pH conditions

The reaction of an acidic unit

$$HA \stackrel{\mathcal{K}}{\leftrightarrows} A^- + H^+$$

Is happening only simultaneously with one of these two

$$H^+ \iff Na^+$$
 $2H^+ \iff Ca^{2+}$

$$\begin{split} \mathrm{HA} & \stackrel{\mathsf{K}'}{\leftrightarrows} \mathrm{A}^- + \mathrm{Na}^+, \quad \mathsf{K}' = \mathsf{K} \exp(\mu_{\mathrm{H}^+} - \mu_{\mathrm{Na}^+}) \\ 2\mathrm{HA} & \stackrel{\mathsf{K}''}{\leftrightarrows} 2\mathrm{A}^- + \mathrm{Ca}^{2+}, \quad \mathsf{K}'' = \mathsf{K} \exp(2\mu_{\mathrm{H}^+} - \mu_{\mathrm{Ca}^{2+}}) \end{split}$$